TPS STEAM into Chemistry

TPS STEAM into Chemistry Executive Summary

Section 1. Science-Related Texas Essential Knowledge and Skills (TEKS) and English Language Proficiency Standards (ELPS) Alignment

TEKS Student %	TEKS Teacher %	ELPS Student %	ELPS Teacher %
100%	100%	100%	100%

Section 2. Instructional Anchor

- The materials are designed to strategically and systematically integrate scientific and engineering practices, recurring themes and concepts, and grade-level content as outlined in the TEKS.
- The materials anchor the learning in phenomena and problems as the key lever for driving learning and student mastery of disciplinary knowledge and skills.

Section 3. Knowledge Coherence

- The materials are designed to build knowledge systematically, coherently, and accurately.
- The materials provide some educative components to support teachers' content and coherence knowledge.

Section 4. Productive Struggle

- The materials provide opportunities for students to engage in productive struggle through sensemaking that involves reading, writing, thinking, and acting as scientists and engineers.

Section 5. Evidence-Based Reasoning and Communicating

- The materials promote students' use of evidence to develop, communicate, and evaluate explanations and solutions.
- The materials provide teacher guidance to support student reasoning and communication skills.

Section 6. Progress Monitoring

- The materials include a variety of TEKS-aligned and developmentally appropriate assessment tools.
- The materials include some guidance that explains how to analyze and respond to data from assessment tools.
- The assessments are somewhat clear and easy to understand.

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Section 7. Supports for All Learners

- The materials provide some guidance on fostering connections between home and school.
- The materials include listening, reading, writing, and speaking supports to help Emergent Bilinguals meet grade-level science content expectations.
- The materials include some research-based instructional methods that appeal to a variety of learning interests and needs.
- The materials include guidance, scaffolds, supports, and extensions that maximize student learning potential.

Section 8. Implementation Supports

- The materials include year-long plans with practice and review opportunities that support instruction.
- The materials include classroom implementation support for teachers and administrators.
- The materials provide implementation guidance to meet variability in program design and scheduling.

Section 9. Design Features

- The visual design of materials is somewhat clear and easy to understand.
- The materials are somewhat designed to engage and support student learning with the integration of digital technology.
- The digital technology or online components are somewhat developmentally and course-appropriate and provide support for learning.

Section 10. Additional Information

- The publisher submitted the technology, price, professional learning, and additional language supports.

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Indicator 2.1

Materials are designed to strategically and systematically integrate scientific and engineering practices and course-level content as outlined in the TEKS.

1	Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices as outlined in the TEKS.	M
2	Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level or course as outlined in the TEKS.	M
3	Materials include sufficient opportunities, as outlined in the TEKS, for students to ask questions and plan and conduct classroom, laboratory, and field investigations, and engage in problem-solving to develop an understanding of science concepts.	M

Meets | Score 4/4

The materials meet the criteria for this indicator. Materials integrate scientific and engineering practices and course-level content as outlined in the TEKS.

Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices as outlined in the TEKS. Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level or course as outlined in the TEKS. Materials include sufficient opportunities, as outlined in the TEKS, for students to ask questions and plan and conduct classroom, laboratory, and field investigations, and engage in problem-solving to develop an understanding of science concepts. Evidence includes but is not limited to:

Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices as outlined in the TEKS.

- Materials provide opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices outlined in the TEKS via various hands-on-digital, writing, and research activities throughout the units, including expository text. The scope and sequence in the front pages of the teacher textbook identifies which SEPs are covered in each core area. For example, in lesson TEKS 13B/D, students begin the lesson on calorimetry with an expository text that allows students to ask questions and define problems in a familiar situation. The text reads, "Saturday night comes and it's time to sit back, put a movie on the TV, and a pizza in the oven. When the pizza comes out of the freezer, the cheese and the dough are both at the same temperature (0oC). When the pizza comes out of the oven, the cheese and the dough are again both at the same temperature (the temperature of the oven). So why is it then that when you take a bite of your pizza, the cheese burns the top of your mouth, but the dough does not?" In the scope and sequence in the front pages, the materials clearly online that "Core Area 4: Quantitative Chemistry - Molecular and Empirical Formula" covers TEKS 3A, developing explanations and proposing solutions.
- Materials address explicit teaching of science and engineering practices (SEPs) within lessons at the beginning of the scope and sequence. For example, in lesson TEKS 1A, students read a series of expository texts to develop SEPs 1A-D. For example, students have the opportunity to read about the history and investigation that led to our current process of refining oil. The text

continues by defining the original problem: animal fats used to lubricate steam engines became viscous in colder temperatures. The text continues to describe viscosity differences in different oil products. The student task allows scholars to practice SEPs as scientists do through multiple student tasks. An example is student task 1, where students are asked to research different SAE oil codes to determine suitable ratings for different types of engines.

- Additionally, the materials include teacher support materials, which provide a "Chemistry - TEKS 1-4 Guide," which outlines which component is tied to each SEP. For example, TEKS 1B can be found in Calorimetry, Solubility, Asking Questions Based on Observations and Information, Developing and Using Models, Evaluating Experimental and Engineering Design, and Scientific Practices, which include specific page numbers.

Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level or course as outlined in the TEKS.

- The materials provide opportunities for students to develop content knowledge within the lessons. For example, Lesson 5A introduces and explains the development of the periodic table over time. Lesson 5B teaches the properties of each of the groups of the periodic table. Lesson 5C examines trends in the periodic table, such as reactivity, atomic mass, and ionization energy. For each of the 5A-C lessons, the materials provide expository information for students with labeled diagrams and drawings within the lesson. At the end of the expository text, there are knowledge-based practice questions to assess student knowledge.
- Moreover, Unit 1 of the "Teacher Textbook" allows the students to understand the importance of asking questions, defining problems, planning investigations, safety, using tools, and using models using familiar, low-stakes examples. Later in the course materials, students have the opportunity to apply these same skills within the chemistry science concepts. For example, in lesson TEKS 5C, students are presented with the task of safely observing lithium and sodium in a bowl of water by using safety goggles.
- The curriculum materials also support the key lesson vocabulary and spiraling of content to the systematic and strategic development of students' content knowledge and skills as appropriate for the concepts and courses outlined in the TEKS. For example, in lesson TEKS 7B, the prior knowledge section of the plenary guide identifies TEKS 7A as prior knowledge, the guide then outlines vocabulary terms to prioritize for the lesson, which includes definitions to nomenclature, cation, anion, IUPAC, binary covalent compound, and oxidation state.

Materials include sufficient opportunities, as outlined in the TEKS, for students to ask questions and plan and conduct classroom, laboratory, and field investigations, and engage in problem solving to develop an understanding of science concepts.

- The textbook begins with a look into TEKS 1A that describes the importance of students learning to ask questions and observe what they see in the phenomena-related activities. This information is in the teacher's textbook on pages 1-2.
- The materials include opportunities, as outlined in the TEKS, for students to engage in problem-solving, plan and conduct classroom, laboratory, and field investigations, and develop an understanding of science concepts. Throughout the course, students have multiple practical tasks to explore new scientific concepts. For example, in lesson TEKS 9B, students engage in an investigation into redox reactions where they are asked, "What question are you trying to answer or problem are you trying to solve?" and "How will the observations you make/data you collect allow you to answer this question/solve the problem?" Additionally, in lesson TEKS 7D,

students are tasked with a practical activity to investigate solubility. Afterward, students respond to questions such as “What is the most appropriate equipment to use?” and “When the investigation is complete, evaluate your experimental design.”

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Indicator 2.2

Materials anchor the learning in phenomena and problems as the key lever for driving learning and student mastery of disciplinary knowledge and skills.

1	Materials embed phenomena and problems across lessons to support students in constructing, building, and developing knowledge through authentic application and performance of scientific and engineering practices and course-level content as outlined in the TEKS.	M
2	Materials intentionally leverage students' prior knowledge and experiences related to phenomena and engineering problems.	M
3	Materials clearly outline for the teacher the scientific concepts and goals behind each phenomenon and engineering problem.	M

Meets | Score 4/4

The materials meet the criteria for this indicator. Materials anchor the learning in phenomena and problems as the key lever for driving learning and student mastery of disciplinary knowledge and skills.

Materials embed phenomena and problems across lessons to support students in constructing, building, and developing knowledge through authentic application and performance of scientific and engineering practices and course-level content as outlined in the TEKS. Materials intentionally leverage students' prior knowledge and experiences related to phenomena and engineering problems. Materials clearly outline for the teacher the scientific concepts and goals behind each phenomenon and engineering problem.

Evidence includes but is not limited to:

Materials embed phenomena and problems across lessons to support students in constructing, building, and developing knowledge through authentic application and performance of scientific and engineering practices and course level content as outlined in the TEKS.

- The materials include phenomena that connect to real-world scenarios across lessons. For example, in lesson 13A, teacher guidance reads, "The teacher should describe real-world examples of each of the laws of thermodynamics. The expository text contains examples, and images from those examples can be seen on slides 6-9." The materials provide students with real-world phenomena of the Zeroth Law by describing how a hot cup of coffee will change the surrounding temperature, making it warmer, and after some time, the cup becomes room temperature. Later, the text describes the anomaly of deflating, sealed balloons and connects this to the Second Law of Thermodynamics, the text then connects learning of the second law of thermodynamics with the first phenomena presented, the cooling cup of coffee. The text continues to provide additional real-world connections for students to make for the remaining laws of thermodynamics. After the expository text, the students perform the demonstrations on slides 11-16. During these demonstrations, students should think about how they relate the laws of thermodynamics learned in today's lesson. This is a clear example of students being guided to real-world examples of each law of thermodynamics.
- Additionally, in lesson 13B/D, students begin the lesson on calorimetry with an expository text that allows students to ask questions and define problems in a familiar situation. The text reads,

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"Saturday night comes and it's time to sit back, put a movie on the TV, and a pizza in the oven. When the pizza comes out of the freezer, the cheese and the dough are both at the same temperature. When the pizza comes out of the oven, the cheese and the dough are again both at the same temperature (the temperature of the oven). So why is it then that when you take a bite of your pizza, the cheese burns the top of your mouth, but the dough does not?

Materials intentionally leverage students' prior knowledge and experiences related to phenomena and engineering problems.

- The materials offer support for both teachers and students in addressing situations where explanations based on prior knowledge may be insufficient or incomplete. To assist teachers in identifying areas where students might possess misconceptions or incomplete understanding, each unit includes a dedicated section called "Misconceptions." For example, in lesson 8C, the Teacher Textbook, the "Misconceptions" section outlines that "When determining percentage composition, students may forget to account for the presence of more than one atom of an element in a compound. For example, in Al2O3, students can sometimes arrive at an RMM of 43 instead of 102 as they only count the mass of one aluminum atom and one oxygen atom."
- Materials intentionally leverage students' prior knowledge and experiences within previously covered content by outlining prerequisite TEKS within the "Prior Knowledge" section. For example, in lesson 4A, under the "Prior Knowledge" section, the materials suggest, "8(A) Define mole and apply the concept of molar mass to convert between moles and grams." The section continues with additional clarity, "Here students learned how to calculate the Relative Formula Mass of a compound." Another example can be seen in lesson 6E, where the "Prior Knowledge section lists TEKS 6A-D.
- Additionally, in the Teacher Textbook, there is a "Teacher Background" section that provides additional clarity about students' prior knowledge. For example, in lesson 4A, under the "Teacher Background," the materials suggest, "In the previous lessons, students have learned to define a mole and solve problems requiring the calculation of the number of atoms or molecules in a sample of known mass. In this lesson, students will learn about percentage composition." The text continues with a sample calculation of aluminum oxide with working shown.

Materials clearly outline for the teacher the scientific concepts and goals behind each phenomenon and engineering problem.

- The materials identify student learning goals behind lessons throughout the units of study. Each lesson contains the "Teacher Background" section within the *Teacher Textbook*, which outlines all science concepts taught within a lesson. The skills are targeted toward scientific and engineering practices. Lesson materials provide a "Teacher Background" section outlining overarching learning goals for each lesson. For example, in lesson 6E, the "Teacher Background" section reads, "In the last lesson, students learned how to calculate the average mass number of an element using isotopic composition. In this lesson, students will learn to construct models to express the arrangement of electrons in atoms." The text continues by providing clarity on the visualization of Lewis dot diagrams.
- Additionally, in lesson 9A, the "Teacher Background" section reads, "In the first lesson in a unit in which students will learn how matter is accounted for in chemical reactions. In this lesson students will learn about the following types of reactions: Synthesis Reactions… Decomposition Reactions…" then lists a description of each.

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- In lessons, phenomena are present in the curriculum to base instruction on real-world applications and scientific engineering practices where the goals of the phenomena are explicitly communicated. For example, in lesson TEKS 13B/D, students begin the lesson on calorimetry with an expository text that allows students to ask questions and define problems in a familiar situation. The text reads, “Saturday night comes, and it’s time to sit back, put a movie on the TV, and a pizza in the oven. When the pizza comes out of the freezer, the cheese and the dough are both at the same temperature (0oC). When the pizza comes out of the oven, the cheese and the dough are again both at the same temperature (the temperature of the oven). So why is it then that when you take a bite of your pizza, the cheese burns the top of your mouth, but the dough does not?”

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Indicator 3.1

Materials are designed to build knowledge systematically, coherently, and accurately.

1	Materials are designed for students to build and connect their knowledge and skills within and across units.	M
2	Materials are intentionally sequenced to scaffold learning in a way that allows for increasingly deeper conceptual understanding.	M
3	Materials clearly and accurately present course-specific core concepts and science and engineering practices.	M
4	Mastery requirements of the materials are within the boundaries of the main concepts of the course.	M

Meets | Score 6/6

The materials meet the criteria for this indicator. Materials are designed to build knowledge systematically, coherently, and accurately.

Materials are designed for students to build and connect their knowledge and skills within and across units. Materials are intentionally sequenced to scaffold learning in a way that allows for increasingly deeper conceptual understanding. Materials clearly and accurately present course-specific core concepts and science and engineering practices. Mastery requirements of the materials are within the boundaries of the main concepts of the course.

Evidence includes but is not limited to:

Materials are designed for students to build and connect their knowledge and skills within and across units.

- The materials within the *Teacher Textbook* include a scope and sequence for each unit that builds in complexity as the unit progresses. For example, in “Core Area 2 - Atomic Theory,” students first learn “how new evidence led to the development of the atomic model over time,” then “students will take a more detailed look into the modern atomic model” before learning about “emission spectra” and “isotopic composition.”
- The materials feature a design that builds and connects student knowledge and skills within a unit as well as across units. For example, the materials provide a prior knowledge section that connects back to previous Texas Knowledge and Essential Skills (TEKS). For example, Lesson 10A includes a prior knowledge section that states, “TEKS (9C) Here students learned that volume of a gas can be determined by not just the number of particles it contains, but also the pressure and temperature.” The *Teacher Textbook* also provides opportunities for connections within and across units. For example, Lesson 7A in the Teacher Textbook includes an “Expository Text for Students” section that guides the teacher by stating, “This part of the lesson gives students an opportunity to review the Lewis dot diagrams that they studied in lesson 6E. Ask students to draw Lewis dot diagrams for the compounds mentioned.”

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Materials are intentionally sequenced to scaffold learning in a way that allows for increasingly deeper conceptual understanding.

- The materials are sequenced in a way that activates or builds prior knowledge before explicit teaching by sequencing TEKS in the order outlined by TEA, which clearly builds on the previous. For example, in "Core Area 1," in lesson TEK 6A, students first learn about the development of the atomic model before learning the subatomic particles that make up an atom in lesson TEKS 6B. Later in "Core Area 1," students then progress to learn about isotopes in lesson TEKS 6D, which requires an understanding of subatomic particles learned in lesson 6B. The materials are sequenced in a way that allows for increasingly deeper conceptual understanding. For example, at the beginning of Unit 9, students are presented with the 9A lesson starter, where the teacher ignites iron wool. Students should monitor the scale to determine no change in mass. This concrete example clearly outlines the tenets of the law of conservation of mass before students are asked to analyze an incorrect example of a chemical reaction that they just observed within the hook on the provided slides. Students are asked what is wrong with the equation and are given ball and stick models to act out the incorrect reaction, this leads to the students' understanding of the incorrect number of atoms of each element in the equation. The lesson progresses by having students write balanced chemical equations before introducing reaction types, such as decomposition and single-replacement reactions.
- The course builds upon concepts throughout the lessons. Each lesson includes an extension activity to deepen the learning. The complexity of the concept is deepened for those students who are ready for a challenge. For example, students research the development of the atomic theory over time, the extension work provides an opportunity for students to continue their research on how the atomic model evolved after the introduction of Bohr's model in Chemistry lesson, 6A.

Materials clearly and accurately present course specific core concepts and science and engineering practices.

- The materials present grade-specific core concepts and science and engineering practices. For example, the "Pacing Plan/Year Planner" provides teachers with a clear and accurate outline of the content covered in the materials. A calendar is provided and includes information on what students will learn in each unit. For example, "Core Area 1 - The Periodic Table" includes a unit objective that states, "In this lesson, students will learn to unlock the mysteries of the periodic table." It goes on to provide information on what students will be able to do, such as "carry out practical investigations, research, and use models to develop explanations."
- Materials clearly and accurately present engineering concepts. The *Student Textbook* and *Teacher Textbook* include lessons that present the science and engineering practices (SEPs). For example, Lessons 1A through 4C cover the SEPs. Lesson 1A covers "TEKS (1A): Ask questions and define problems based on observations or information from text, phenomena, models, or investigations." The materials state, "In this lesson students will learn to ask questions and define problems based on observations or information from text, phenomena, models, or investigations."
- The materials include a "Chemistry TEKS 1 - 4 Guide" that connects the SEPs to the specific content lessons located in the Student Textbook and Teacher Textbook. For example, TEKS 1F can be found in the Student Textbook in lessons on Kinetic Molecular Theory, Nuclear Fission and Fusion, and Applications of Nuclear Phenomena.

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Mastery requirements of the materials are within the boundaries of the main concepts of the course.

- The materials include specific learning targets for each course. For example, materials provide a scope and sequence document that outlines when TEKS will be covered across each unit. Also, in the scope and sequence, there is a list of TEKS correlated to units of study and associated learning targets aligned with the standards.
- The materials provide a lesson plan for each lesson that includes learning objectives aligned with the TEKS, which outline the boundaries of the content in each lesson. For instance, the learning objectives in Lessons 11A and 11B ask the students to “describe the unique role of water” and to “distinguish between types of solutions.”
- Additionally, the “Pacing Plan/Year Planner” includes objectives for the units as a whole, which correlate with the objectives in each lesson. For example, in Lesson 6A, one of the learning objectives states, “Explain the problems with Rutherford's atomic model and how Bohr tried to address them.” This objective correlates with the unit objective provided for “Core Area 2 - Atomic Theory,” which states, “Students will learn how new evidence led to the development of the atomic theory over time.”
- The resource offers multiple activities within each TEKS section to facilitate the learning of concepts. Furthermore, the “Assessment Generator” accompanying this material includes questions that align with the expected level of mastery for students. It also includes more challenging and less challenging questions, allowing teachers to accurately assess students' understanding of the material and determine their progress within the boundaries of the course. For example, under “Core Area 2,” Science Concepts 6, there are a variety of questions to assess mastery of this science concept. For instance, “State 3 differences between the plum pudding model and the modern atomic model.”

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Indicator 3.2

Materials provide educative components to support teachers' content and knowledge coherence.

1	Materials support teachers in understanding the vertical alignment of course-appropriate prior knowledge and skills guiding the development of course-level content and scientific and engineering practices.	PM
2	Materials contain explanations and examples of science concepts, including course-level misconceptions to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS.	M
3	Materials explain the intent and purpose of the instructional design of the program.	M

Partial Meets| Score 3/6

The materials partially meet the criteria for this indicator. Materials provide some educative components to support teachers' content and knowledge coherence.

Materials support teachers in understanding the vertical alignment of course-appropriate prior knowledge and skills guiding the development of course-level content, but not scientific and engineering practices. Materials contain explanations and examples of science concepts, including course-level misconceptions to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS. Materials explain the intent and purpose of the instructional design of the program.

Evidence includes but is not limited to:

Materials support teachers in understanding the vertical alignment of course appropriate prior knowledge and skills guiding the development of course level content and scientific and engineering practices.

- The materials include a section titled "Prior Knowledge" in "Teacher Textbook" and the "Student Textbook" that contains a list of the Texas Essential Knowledge and Skills (TEKS) previously taught within the course and grade level. This section addresses horizontal alignment within the course, not vertical alignment across previous grade levels. For example, in Lesson 6A, the students are expected to already know TEKS 5C, "analyze and interpret elemental data, including atomic radius, atomic mass, electronegativity, ionization energy, and reactivity to identify periodic trends."
- The materials provide a "Horizontal and Vertical Alignment Information" document that includes an overview of the appropriate knowledge and skills prior to the students learning the current content. While there is a section for prior knowledge connections, there is a gap in the presence of specific Science and Engineering Practices (SEPs) connections within the lessons, and the materials do not explicitly list the SEPs.

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Materials contain explanations and examples of science concepts, including course level misconceptions to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS.

- Materials contain explanations for teachers on grade-level misconceptions to support teachers' subject knowledge. The "Teacher Textbook" includes a section titled "Misconceptions" that provides the teacher with guidance on anticipated misconceptions. For example, in the lesson for TEKS 6A, the materials state that students will find the concept of energy levels difficult to understand. To address this confusion, "the teacher should explicitly address this when highlighting the difference between Rutherford's atomic model and Bohr's atomic model. The concept of energy levels will be revisited in future lessons."
- Materials contain explanations and examples of science concepts for teachers. A section titled "Teacher Background" is provided at the beginning of each lesson to support the teacher's subject knowledge. This section provides the teacher with a brief overview of the concepts necessary to support student learning within a lesson. For example, the "Teacher Background" for lesson TEKS 11E states that "students will need to recall that a mole is a unit of measurement…" and provides the teacher with examples of how the mole can be used to measure.
- The materials provide sections titled "How to Help RTI Students," "How to Help ELL/ESL Students," and "How to Help Special Education Students" to help support the teacher's recognition of barriers to student conceptual development. For example, in the lesson for TEKS 1B, the materials state that the teacher can "create a science word wall for the classroom and maintain it throughout the year."

Materials explain the intent and purpose of the instructional design of the program.

- The materials provide an overview of the intent and purpose of the instructional design within the "High School Sciences Teacher Program Guide." The guide includes a program introduction that contains the material's "philosophy of science teaching and learning" as well as a section detailing "research-based strategies" and the included components within the program.
- The materials provide a "Family/Caregiver Guide - High School" that explains the intent and purpose of the instructional design of the program. Again, a program introduction that includes the material's "philosophy of science teaching and learning and research-based strategies" is provided.
- The materials include "Horizontal and Vertical Alignment Information," a document that explains the purpose of implementing the "STEAM (science, technology, engineering, arts, and math) approach." This approach was chosen "to provide an introduction to science in a personally relevant manner as part of a series of curricula aimed to engage students in science presented using several methodologies."

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Indicator 4.1

Materials provide opportunities for students to engage in productive struggle through sensemaking that involves reading, writing, thinking, and acting as scientists and engineers.

1	Materials consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers.	M
2	Materials provide multiple opportunities for students to engage with course-level appropriate scientific texts to gather evidence and develop an understanding of concepts.	M
3	Materials provide multiple opportunities for students to engage in various written and graphic modes of communication to support students in developing and displaying an understanding of scientific concepts.	M
4	Materials support students to act as scientists and engineers who can learn from engaging in phenomena and engineering design processes, make sense of concepts, and productively struggle.	M

Meets | Score 4/4

The materials meet the criteria for this indicator. Materials provide opportunities for students to engage in productive struggle through sensemaking that involves reading, writing, thinking, and acting as scientists and engineers.

Materials support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers. Materials provide opportunities for students to engage with course-level appropriate scientific texts to gather evidence and develop an understanding of concepts. Materials provide multiple opportunities for students to engage in various written and graphic modes of communication to support students in developing and displaying an understanding of scientific concepts. Materials support students to act as scientists and engineers who can learn from engaging in phenomena and engineering design processes, make sense of concepts, and productively struggle.

Evidence includes but is not limited to:

Materials consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers.

- The materials define science as "a way of organizing and understanding the universe around us" and state "students learn best by doing. "The materials define sensemaking as a "conceptual process" where students will engage in activities about and with the natural and/or designed world.
- The materials provided opportunities for sensemaking through reading, writing, thinking, and acting as scientists and engineers. For example, in the lesson "TEKS 1G: Develop and use models to represent phenomena, systems, processes or solutions to engineering problems," the materials prompt students to write summaries of scientific definitions, engage in discussions about the strengths and limitations of different models, create a table that compares and contrasts different scientific models, and propose solutions to enhance the examples of existing models given by the materials.

- The materials include a "Student Journal" to support meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers. For instance, the lesson "TEKS 3B and TEKS 3C" has a section for "Lesson Key Words" that includes vocabulary and definitions important to the lesson, as well as a "Student Focus Exercise" that allows students to create flashcards for each of the vocabulary words. Students then use these flashcards throughout the lesson and communicate with their classmates, "utilizing these new words/phrases" once the lesson is complete. The "Student Journal" also includes sections for students to answer "Key Questions" for each task in the lesson, as well as make observations during experiments and complete homework assignments. For example, "TEKS 3B and TEKS 3C" provide students with the opportunity to "create a booklet that can be used as a guide on how to communicate scientific ideas and explanations effectively."

Materials provide multiple opportunities for students to engage with course level appropriate scientific texts to gather evidence and develop an understanding of concepts.

- The materials provide opportunities for students to engage in course-level appropriate scientific texts in lessons to gather evidence and develop an understanding of concepts. The "Student Textbook" includes a section titled "Expository Text for Students" as well as a "Research History" section for students to read in order to gather evidence and develop an understanding of concepts. For example, in the lesson "TEKS 6C," students read about William Herschel, electromagnetic waves, and the emission spectra within the "Expository Text for Students" section and then get a deeper look at William Herschel and his discovery in the "Research History" section.
- The materials outline key vocabulary for the lesson to ensure equitable opportunities for students to engage with course-level appropriate scientific texts to develop an understanding of concepts by providing a section titled "Lesson Key Words." This section provides students with discipline-specific vocabulary relevant to the TEKS of the lesson. For example, "TEKS 7A: Construct an argument to support how periodic trends such as electronegativity can predict bonding between elements" lists words such as "valence electron," "valence shell," and "electronegativity" as well as the definition of each word to support their understanding of the concepts introduced in the "Expository Text for Students."
- Additionally, the materials provide enrichment opportunities for students to engage with course-level appropriate scientific texts to gather evidence and develop an understanding of concepts within the "TPS Online Library." For example, in the "TPS Online Library- Alaska," a student can access Alaska, A Natural History Textbook and the Spirit of The Arctic.

Materials provide multiple opportunities for students to engage in various written and graphic modes of communication to support students in developing and displaying an understanding of scientific concepts.

- The materials provide multiple opportunities for students to engage in various written modes of communication by including writing activities in each lesson. For instance, in the lesson for "TEKS 11B," the materials prompt students to write responses to questions, write a summary of teacher-presented material, create flashcards, calculate the number of moles of solute in a solution, and write a description of how a solvent dissolves substance that water cannot dissolve.
- The materials provide students with opportunities to develop graphical representations of the content. The "Student Textbook" provides several opportunities within each lesson for students

to create tables, graphic organizers, build models, and design posters. For example, in the lesson "TEKS 6D: Calculate the average atomic mass of an element using isotopic composition," students create "a single box that can be considered an isotope of lithium" using "beads and boxes they were given at the start of the lesson." Students then calculate the average mass number of the boxes they created, allowing students to develop and display an understanding of scientific concepts through graphical representations.

- The materials include a "STEAM Arts Project Guide" that provides students with opportunities to demonstrate their understanding and application of concepts via graphical representations. For instance, in the STEAM Arts project for chemistry titled "Bark Like a Seal," students are prompted to demonstrate their understanding of TEKS 11E, calculating the concentration of solutions in units of molarity, by creating an awareness campaign that uses a poster to show the effects of pollution on the chemical makeup of ocean water. The materials prompt students to calculate the molarity of CO_2 in the ocean, then "think about how they can visually get people to be enticed by the poster and the style in which they present the information."

Materials support students to act as scientists and engineers who can learn from engaging in phenomena and engineering design processes, make sense of concepts, and productively struggle.

- The materials engage students in making sense of concepts through productive struggle by having students analyze their processes when their engineering prototypes or models fail to meet the criteria and or design expectations. One example is the extension activity in which students build an electric motor vehicle from the STEM project guide. Another example is in the Real Science - High School Student Edition, where students build an ice rink model on a cookie sheet. Also, in a lesson on standard 2D, students engage with the engineering design process. They work to craft a proposed investigation process and to work through the types of thinking they would need to use to evaluate their findings.
- The materials support students to act as scientists and engineers by providing students with opportunities to design and conduct investigations to collect empirical data relevant to the TEKS for each lesson. For example, the "Texas High School Chemistry Slides Unit 1: TEKS 1H - Scientific Hypotheses, Theories, and Laws" provides students with an opportunity to formulate a hypothesis based on two observations and design an experiment. Students then analyze their data and draw conclusions before reviewing their experiments to answer questions such as "What went well? Were your intervals and ranges appropriate?" and "How can these be improved?" Throughout the course, students have multiple practical tasks to explore new scientific concepts. For example, in lesson TEKS 9B, students engage in an investigation into redox reactions where they are asked, "What question are you trying to answer or problem are you trying to solve?" and "How will the observations you make/data you collect allow you to answer this question/solve the problem?" Additionally, in lesson TEKS 7D, students are tasked with a practical activity to investigate solubility. Afterward, students respond to questions such as "What is the most appropriate equipment to use?" and "When the investigation is complete, evaluate your experimental design."

TPS STEAM into Chemistry

Indicator 5.1

Materials promote students' use of evidence to develop, communicate, and evaluate explanations and solutions.

1	Materials prompt students to use evidence to support their hypotheses and claims.	M
2	Materials include embedded opportunities to develop and utilize scientific vocabulary in context.	M
3	Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and course.	M
4	Materials provide opportunities for students to construct and present developmentally appropriate written and verbal arguments that justify explanations to phenomena and/or solutions to problems using evidence acquired from learning experiences.	M

Meets | Score 4/4

The materials meet the criteria for this indication. Materials promote students' use of evidence to develop, communicate, and evaluate explanations and solutions.

Materials prompt students to use evidence to support their hypotheses and claims. Materials include embedded opportunities to develop and utilize scientific vocabulary in context. Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and course. Materials provide opportunities for students to construct and present developmentally appropriate written and verbal arguments that justify explanations of phenomena and/or solutions to problems using evidence acquired from learning experiences.

Evidence includes but is not limited to:

Materials prompt students to use evidence to support their hypotheses and claims.

- The materials include experiences that prompt students to use evidence to support their hypothesis and claims through TEKS 1-4 lessons and provide additional prompts for students in investigations.
    - For example, Lesson TEKS 4A allows students to view "information on a product that claims to buffer the pH of water in a fish tank" and conduct "an investigation to collect some empirical data in order to test the scientific claims made by the company." After gathering data, students write a paper "refuting the claims made" by including "empirical evidence from experimental testing, logical reasoning, and critical thinking to present a scientifically coherent evaluation of the claims made about the product."
    - Lesson TEKS 1B prompts students to write out a plan and conduct an investigation for each question posed on the slides, such as "How fast does a snail move?", "Does the time taken for food to go off change if it is in a fridge?" and "Investigation to determine the solubility of sodium chloride at different temperatures." Students plan and conduct at least one of each kind of investigation: a descriptive, comparative, and experimental

investigation. The materials prompt students to "analyze their results for each investigation and use their observations and data to define problems and ask questions that can be solved through future investigation."
    - Lesson TEKS 7D consists of a solubility investigation after they are shown slide 12 to explain why ionic compounds are soluble in water and metallic substances are not. The students create a graphic organizer to show how intermolecular and intramolecular forces govern the properties of ionic, covalent, and metallic substances. After students conduct the investigation, students are asked, "How will the observations you make/data you collect allow you to answer this question/solve this problem."

Materials include embedded opportunities to develop and utilize scientific vocabulary in context.

- The materials provide embedded opportunities to develop and utilize scientific vocabulary in context. For example, a "Lesson Key Word" section is provided at the beginning of each lesson and features a "Student Focus Activity" directly after the listed vocabulary words. Lesson TEKS 11E and 11F include definitions for the vocabulary words that students encounter in the lesson (e.g., concentration, molarity, dilute, and dilution) as well as a focus activity that states, "You will be given the opportunity to speak to your teacher about your reading… After speaking to your teacher, you will be given a piece of text from the classroom. This is likely a leaflet or poster. You need to look at the leaflet or poster and explain what it is about to your teacher."
- The materials provide opportunities to practice the vocabulary with "Key Questions" embedded throughout the learning activities in a lesson. For example, Lesson TEKS 6B includes "Key Questions" such as "What is a nucleon?", "What is meant by the term atomic number?", "What is meant by electron configuration," etc., that prompt the students to develop and utilize scientific vocabulary in context.

Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and course.

- The materials integrate argumentation and discourse to support students' development of content knowledge and skills found within TEKS related explicitly to argumentation and discourse.
    - For example, TEKS 3B states, "Communicate explanations and solutions individually and collaboratively in a variety of settings and formats," and TEKS 3C states, "Engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence." The student task for this lesson provides a list of debate topics and possible roles and states, "Students can either select one of these debates and roles or choose a debate topic and role of their own. Students may be given the option to perform this task either individually or collaboratively. Students should design a scientific presentation to allow them to communicate their explanations/ideas/solutions to the problem being discussed. Students should be asked to prepare at least one of their presentations individually and at least one of their arguments in pairs or groups of 3. Students should decide who they are creating their presentations for and frame the delivery of their presentation accordingly." Afterward, students "present their arguments and engage in respectful scientific discussion against other students playing different roles."
    - Lesson 11H includes an "Enrichment Activity for ALL Students" section that states, "Have students work in pairs and review one another's homework content. The critique should

include proposed edits which teachers should review/confirm." This activity allows students to engage in argumentation and discourse appropriate for the course and content.

Materials provide opportunities for students to construct and present developmentally appropriate written and verbal arguments that justify explanations to phenomena and/or solutions to problems using evidence acquired from learning experiences.

- The materials provide opportunities for students to construct and present developmentally appropriate written and/or verbal arguments that justify explaining phenomena and solutions to problems using evidence required for learning experiences.
    - For example, Lesson TEKS 8A includes homework that states, "Students produce a short scientific report explaining the importance of moles and how the number of moles of elements and compounds can be determined. This report should also include how the mass of a substance can be determined if the number of moles is known." This activity provides students with the opportunity to construct written arguments that justify their explanations using evidence acquired from learning experiences.
    - Lesson TEKS 13A includes an "Extension Work" activity that asks students to "evaluate the statement below and explain why this does not defy the second law of thermodynamics: 'The human body is an example of a system that causes localized decreases in entropy.'"
    - Lesson TEKS 7D includes an "Extension Work" activity that allows students to engage in argumentation and discourse by explaining how intermolecular forces relate to the melting and boiling points of chemicals. The materials state, "Water and ammonia are both simple covalent substances in which hydrogen bonds are present. The melting and boiling points of water are far higher than that of ammonia. Use the idea of intermolecular forces to explain why."

TPS STEAM into Chemistry

Indicator 5.2

Materials provide teacher guidance to support student reasoning and communication skills.

1	Materials provide teacher guidance on anticipating student responses and the use of questioning to deepen student thinking.	M
2	Materials include teacher guidance on how to scaffold and support students' development and use of scientific vocabulary in context.	M
3	Materials provide teacher guidance on preparing for student discourse and supporting students in using evidence to construct written and verbal claims.	M
4	Materials support and guide teachers in facilitating the sharing of students' thinking and finding solutions.	M

Meets | Score 4/4

The materials meet the criteria for this indicator. Materials provide teacher guidance to support student reasoning and communication skills.

Materials provide teacher guidance on anticipating student responses and the use of questioning to deepen student thinking. Materials include teacher guidance on scaffolding and supporting students' development and using scientific vocabulary in context. Materials provide teacher guidance on preparing for student discourse and supporting students in using evidence to construct written and verbal claims. Materials support and guide teachers in facilitating the sharing of students' thinking and finding solutions.

Evidence includes but is not limited to:

Materials provide teacher guidance on anticipating student responses and the use of questioning to deepen student thinking.

- The materials provide a "Misconceptions" section in each lesson that provides guidance on anticipating student responses. For example, the "Misconceptions" section in Lesson TEKS 5C states, "Some students may think that a high electronegativity will cause an atom to be more reactive. The teacher should compare a group-one element and a group-seven element and stress that a high electronegativity only increases reactivity for elements that are looking to gain electrons (and elements that lose electrons become more reactive as their electronegativity drops)."
- "Key Questions" included for every "Student Task" allows the teacher to use questions to deepen student thinking. For example, Lesson TEKS 8A includes key questions for each of the four student tasks as well as questions for the starter of the lesson. The materials guide the teacher to ask questions such as "Do we need the same mass of magnesium as we do oxygen? Explain your answers" "How can we use an equation triangle?" and "What are possible sources of error in the method? What are possible sources of error in the measurements made?"
    - The materials provide an answer key for each of the "Key Questions" throughout the "Student Tasks." This key allows teachers to anticipate students' responses and provides guidance for the teacher.
- "Starter Questions" at the beginning of each lesson provide the teacher with opportunities to use questioning to deepen student thinking. For example, Lesson TEKS 5B provides the starter

question, “How are elements in the modern periodic table ordered?” As students walk in, they view the question and participate in a class discussion that “recaps the idea that elements are ordered into groups in which the elements share similar physical and chemical properties.” The materials encourage students to use non-negotiable words to answer the question, such as “atomic number, mass number, groups, periods, and properties.”

Materials include teacher guidance on how to scaffold and support students’ development and use of scientific vocabulary in context.

- The materials provide guidance through activities that support students’ development and use of scientific vocabulary in context. For example,
    - In Lesson TEKS 11C, the materials state, “Have all students create their own picture glossary cards to support key facts they need to comprehend. Using a visual and tactile approach will assist students in mastering the science language.”
    - In Lesson TEKS 5C, the materials provide a homework activity where students “produce a graphic organizer to explain the meaning of the terms: atomic number, atomic mass, atomic radius, ionization energy, electronegativity, and reactivity.”
    - In Lesson TEKS 10C, the materials state, “Students may struggle with terms and definitions. Science language mastery is vital. Use the Lesson Key Words in the textbook for this lesson and have students tell you what the meaning of each keyword is. Ask students to use the words in a sentence and resolve misconceptions. Create a science word wall for the classroom and maintain it throughout the school year.”
    - At the beginning of each lesson, a “Lesson Key Words” section is provided for both the teacher and students to view to recognize and define key vocabulary words that will be present throughout the lesson.

Materials provide teacher guidance on preparing for student discourse and supporting students in using evidence to construct written and verbal claims.

- The materials provide guidance on preparing students for discourse. The “Guidance on Student Discourse” section in the “Teacher Textbook” states, "Students learn more effectively and progress in their understanding more rapidly when they are given opportunities to reflect critically on their own work of their peers. During this course, students will have many opportunities to work individually and collaboratively, and our lesson plans promote respectful augmentation, critique, and discourse between students. Lessons 3B and 3C of this course are important lessons that are designed to provide students with the skills required to respectfully and effectively engage in scientific discourse and argumentation. Lesson 4A provides students with the skills to critique scientific claims effectively. It is highly recommended that teachers deliver these lessons early in the course and continue to allow students to embed the skills learned from those lessons over the academic year.”
- The materials include teacher guidance on supporting students using evidence to construct written and verbal claims. For example, Lesson TEKS 7C states, “Have students review another student’s homework. Each student must provide a critique in the form of a feedback document that explains any edits required, with a supporting narrative to explain why. Put students into pairs and have this completed. Review with each pair of students proposed edits and discuss and correct misconceptions. Guide students to make final edits and produce accurate content for all students.”

- The materials provide teacher guidance to prepare for student discourse by outlining how students should discuss and analyze results by stating that the teacher should “stress the importance of actively listening to other students during sharing and participating in discussions in a respectful manner.”

Materials support and guide teachers in facilitating the sharing of students’ thinking and finding solutions.

- The materials provide teacher guidance and support for facilitating the sharing of students’ thinking and finding solutions by directing students to work collaboratively to answer questions and review their work. For example, Lesson TEKS 8A in the “Teacher Textbook” includes an “English Language Proficiency Standards - ELPS Activity” that guides the teacher to put students into small groups where they answer a question about the lesson. The materials state, “Students should follow directions to work collaboratively with their peers to answer this question, and therefore demonstrate listening comprehension.”
- The materials also provide opportunities for students to pose and answer questions during reading activities. For example, Lesson TEKS 8B includes a “Student Focus Activity” that guides the teacher to pair students to read a text. Students then “join another pair and retell or summarize the writing…” and finally “ask each other questions” about the reading and “answer questions from other students.”
- Lesson TEKS 11C includes “Learning Activities” that allow students to share their thinking and solutions to problems. The materials guide the teacher to have students answer the question, “How is a supersaturated solution formed?” as they walk into the classroom. Students then complete an investigation to learn “how temperature, agitation, and surface area affect the rate of dissolution of sugar in water.” The materials prompt the teacher to allow students to “think about the ways in which the methods could be improved” and then “make these adjustments and repeat the investigation.” Finally, students will use their “understanding of solutions and scientific ideas to explain why rates of dissolution are affected by the factors. The “Learning Activities” end in a classroom discussion where students share their ideas.

TPS STEAM into Chemistry

Indicator 6.1

Materials include a variety of TEKS-aligned and developmentally appropriate assessment tools.

1	Materials include a range of diagnostic, formative, and summative assessments to assess student learning in a variety of formats.	M
2	Materials assess all student expectations over the breadth of the course and indicate which student expectations are being assessed in each assessment.	M
3	Materials include assessments that integrate scientific concepts and science and engineering practices.	M
4	Materials include assessments that require students to apply knowledge and skills to novel contexts.	M

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include a variety of TEKS-aligned and developmentally appropriate assessment tools.

Materials include a range of diagnostic, formative, and summative assessments that include formal and informal opportunities to assess student learning in a variety of formats. Materials assess all student expectations over the breadth of the course and indicate which student expectations are being assessed in each assessment. Materials include assessments that integrate scientific concepts and science and engineering practices. Materials include assessments that require students to apply knowledge and skills to novel contexts.

Evidence includes but is not limited to:

Materials include a range of diagnostic, formative, and summative assessments to assess student learning in a variety of formats.

- The materials include a variety of formative assessments to assess student learning. For example, the materials provide Key Questions in the Student and Teacher Textbooks for every lesson. The Lesson TEKS 6B materials include key questions for the starter activity and each student task. Key Questions for the starter include, “What is a nucleon?” and “What is meant by electron configuration?” Key Questions for the student tasks include, “Why do neutrons have no overall charge?” and “What is an elementary particle?”
- The materials include a variety of diagnostic and summative assessments to assess student learning. For example, the materials include an “Interactive Assessment Tool - Online Tests and Quizzes” that teachers can use to assess student learning before, during, and after content has been taught. In addition, the materials include an assessment bank with multiple-choice and open-ended questions that allow the teacher to create both formal and informal assessments.
- The materials include “Short Tests” within the High School Chemistry Slides. For example, the slides for “TEKS 12D” include a three-question “Short Test” that can be given at the end of the lesson. The questions include “Describe what you would observe when watching the following reaction (hint: use state symbols). $Na2CO3(s) + 2HCl(aq) \rightarrow 2NaCl(aq) + CO2(g) + H2O(l)$ Write the word equation for the above reaction. State the word equation for two other reactions that would result in the formation of sodium chloride.”

- The Teacher Program Guide provides support for teachers and includes a section on the location of diagnostic, formative, and summative assessment tools. For example, the guide states:
    - "Diagnostic - the interactive software tool provides automated grading for multiple choice questions; Benchmark tests (Level 1, 2 and 3 Assessments) in Online Library - Blackline Master."
    - "Formative - Level 1 questions in the interactive software tool or assessment generator; STEM project Explore 1 and 2; Let's Talk About It, Let's Draw It, Stop, Look, Think! - Amelia Rose arts projects."
    - "Summative - Level 2 and 3 questions in the interactive software tool or assessment generator; Test yourself, Focus questions, Multiple choice, Open-ended, Science makers, Performance tasks with rubrics; STEM project Explore 3."

Materials assess all student expectations over the breadth of the course and indicate which student expectations are being assessed in each assessment.

- The materials indicate which student expectations are being assessed in each assessment. The publisher provides "Benchmark and Assessment Tests" that can be given at the middle and end of the course. These tests are broken down into specific student expectations. For example, the "Chemistry Student" Benchmark and Assessment Test is broken down into different specific TEKS. The first two questions on the test connect to TEKS 5A: "Explain the development of the Periodic Table over time using evidence such as chemical and physical properties. Similarly, all tasks within each lesson, including informal homework assignments to assess mastery of specific student expectations.
- As outlined in the TEKS, the materials assess all student expectations within the course and indicate science concepts within the "Assessment Generator." This tool allows teachers to select which TEKS cluster or core idea they want to assess. Teachers can create tests from sample questions with 22 different assessment styles, like multiple choice and short answer options. Teachers may assign and review the scores online and correct the open-ended responses students have submitted. For example, the Assessment Generator includes Core Areas 1-10 (The Periodic Table through Nuclear Phenomena) and has various level 1, 2, and 3 multiple-choice questions. The questions are broken down into the overarching TEKS, such as "TEKS 5. Science Concepts - The student understands the development of the Periodic Table and applies its predictive power." Sorting questions into concepts is helpful, though can be cumbersome to identify specific questions to target student expectations.
- The materials include an assessment matrix file for each student that allows the teacher to see how a student has performed overall on the benchmark tests, focus questions, and performance tasks over the year. This assessment matrix is created in the online tool features and can be included with a student report card to send home to the caregivers. The student expectations are defined by the tools to showcase student performance for each standard within the course.
- Materials include Student Tasks that integrate science concepts and science and engineering practices (SEPs) and include a horizontal alignment document that aligns each SEPs with each Student Task. For example, in the Student Tasks for Lesson 10A, the materials prompt students to observe a phenomenon related to temperature, pressure, and gas behavior and then make predictions based on their observations. The materials prompt students to complete more investigations, then communicate scientific explanations for their observations. The "Horizontal Alignment Chart - Chemistry" states that Student Task 1 aligns with SEPS 1A, 4C, and 1F.

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Materials include assessments that integrate scientific concepts and science and engineering practices.

- The materials include a STEAM into Arts Project Guide that integrates the scientific concepts and science and engineering practices that can be used to assess student mastery. For example, the project "The Door to Hell" indicates that the standards for the project include TEKS 1G, "develop and use models to represent phenomena, systems, processes, or solutions to engineering problems." The project also indicates that the aim of the project is for students to be able "to differentiate between physical and chemical" properties and changes.
- Materials include informal assessments such as investigations that integrate science concepts and SEPS. For example, in the Student Tasks for lesson "TEKS 10A," the materials prompt students to observe a phenomenon related to temperature, pressure, and gas behavior and then make predictions based on their observations. The materials prompt students to complete more investigations and then communicate scientific explanations for their observations. The "Horizontal Alignment Chart - Chemistry" indicates the SEPs involved in each student task for each lesson.
- The "Assessment Generator" includes questions for Core Areas 1–10 (The Periodic Table to Nuclear Phenomena). For example, the Assessment Generator begins with TEKS 5, covering the development of the Periodic Table, and ends with TEKS 14, covering nuclear chemistry. Questions for TEKS 14 include "An unstable isotope of element X has an atomic number of 90. This isotope emits beta radiation. What happens to the atomic number?" and multiple choice answers "a) it increases by 1, b) it decreases by 1 c) it increases by 4 d) it decreases by 4." The "Assessment Generator" does not include questions for SEPS TEKS 1-4.

Materials include assessments that require students to apply knowledge and skills to novel contexts.

- The materials include assessments that require students to apply knowledge and skills to novel contexts. For example, the materials include a STEAM Arts Projects Guide K-12 that allows students opportunities for project-based learning experiences. Students use SEPs to complete these projects. In the "Practicality of Shoes" project, students "demonstrate an understanding of the use and conservation of resources" and "demonstrate the proper disposal or recycling of materials" by "creating a pair of shoes out of recycled materials to show how resources can be conserved and recycled properly."
- The materials include a plenary section at the end of each lesson to evaluate the learning of all students. Lesson TEKS 14A in the Teacher Textbook includes a plenary section that states, "Students should draw a sketched version of the stability curve and label the areas where isotopes are likely to give off alpha, beta, and positron (beta plus) radiation. Students should explain why isotopes found on these parts of the graph should be expected to emit these types of radiation and the processes in the nucleus that lead to beta and positron decay."
- The Student Journal contains key questions and homework assignments that require students to apply their knowledge and skills. For example, the Student Journal for TEKS 1B includes questions such as "What is a control group?" and "Why are control groups important?" as well as a homework assignment that states, "Students should produce a guide to the difference between descriptive, comparative, and experimental research, using examples from the field of Chemistry."

TPS STEAM into Chemistry

Indicator 6.2

Materials include guidance that explains how to analyze and respond to data from assessment tools.

1	Materials include information and/or resources that provide guidance for evaluating student responses.	M
2	Materials support teachers' analysis of assessment data with guidance and direction to respond to individual student's needs, in all areas of science, based on measures of student progress appropriate for the developmental level.	PM
3	Assessment tools yield relevant information for teachers to use when planning instruction, intervention, and extension.	M
4	Materials provide a variety of resources and teacher guidance on how to leverage different activities to respond to student data.	PM

Partial Meets| Score 1/2

The materials partially meet the criteria for this indicator. Materials sometimes include guidance that explains how to analyze and respond to data from assessment tools.

Materials include information and/or resources that provide guidance for evaluating student responses. Materials support teachers' analysis of assessment data with some guidance and direction to respond to individual student's needs, in all areas of science, based on measures of student progress appropriate for the developmental level. Assessment tools yield relevant information for teachers to use when planning instruction, intervention, and extension. Materials provide some resources and teacher guidance on how to leverage different activities to respond to student data.

Evidence includes but is not limited to:

Materials include information and/or resources that provide guidance for evaluating student responses.

- The materials include information that guides teachers in evaluating student responses on formative assessments. For example, in Lesson 1E/1F on interpreting data, teachers are provided with questions, an answer key with exemplar answers, and possible misconceptions (e.g., that students may be confused between a chart and a graph) to consider. For example, one question is for students to analyze data and describe the line of best fit. The answer key states that "a line of best fit is a prediction of how the data would appear if all variables, measurements, and conditions had been perfect. It allows us to identify and analyze trends more clearly and make further predictions about how the data would progress beyond the measurements made in the investigation."
- The materials include answer keys to Key Questions that appear within the Student and Teacher Textbooks within each lesson to support teaching in evaluating students informally and in the moment. For example, the lesson on "TEKS 11A and 11B" includes the starter question "What is a solvent?" and the answer "A solvent is a liquid in which a solute will dissolve. In some circumstances, a solvent may be a solid or a gas."
- The Assessment Generator includes information that provides guidance for evaluating student responses by including an answer key with an exemplar student response example for each question. For example, in "Core Area 4- Chemistry," the first question for TEKS 6, "State 3 differences between the plum pudding model, and the modern atomic model." Then, provide an

exemplar response example stating, “Possible answers include: the plum pudding model contains no empty space, no nucleus, no protons, no electron shells, and has electrons on the inside of the atom.” Additionally, the assessment generators provide correct responses for all multiple choice questions. For example, in “Core Area 6 - Chemistry,” There is a question that reads, “Which law states that at a constant temperature, the pressure exerted by a gas is inversely proportional to its volume?” The correct answer is shown: b) Boyle’s law.

Materials support teachers' analysis of assessment data with guidance and direction to respond to individual student’s needs, in all areas of science, based on measures of student progress appropriate for the developmental level.

- The materials provide the teacher with an Assessment Matrix that can be used to record student performance data for each of the TEKS addressed in the materials. The Assessment Matrix includes each of the 14 TEKS, such as TEKS 6, “The student understands the development of atomic theory and applies it to real-world phenomena.” However, the materials do not include guidance on how to use the data that is made visible by this assessment matrix when identifying and responding to students' needs.
    - The Teacher Program Guide includes a section on how the assessment tools work and the resulting information. This section states, “How to use the tools - review the written content in this teacher guide and watch each of the videos available online below.” While the materials list a video for “How to create and use the assessment matrix and report card,” this video is not available.
- The materials include guidance on using assessment data for individual student needs within each lesson's “How to Help RTI Students” section. For example, in the “TEKS 9B” lesson, the materials state, “Have students attempt the questions in the Online library- Assessment generator for level 1 TEKS 9B. Discuss responses on a one-to-one basis… Have students review the content of G8 6C in the Online Library - Intervention Focus Tutorial, which does not show students any grade or TEKS language, so it has no stigma. Then have students answer Level 1-3 questions at that grade level before moving onto the current level 1-3 questions in high school for TEKS 9B.”
- Additionally, benchmark assessments provide a rationale to guide teachers on responding to students' incorrect responses. For example, the “Benchmark & Assessment Tests” question 1 provides the rationale, “Option D is correct” then states the rationale, “Mendeleev left gaps in his table where he had predicted that undiscovered elements at the time should fit into based upon their physical and chemical properties.” Then provides rationale on why all other answer choices are incorrect. For instance, “Option A is incorrect,” then states the rationale, “At that time, the concept of atomic number was unknown as the subatomic particles, protons, had not been discovered.”

Assessment tools yield relevant information for teachers to use when planning instruction, intervention, and extension.

- Assessment tools yield relevant information for teachers to use when planning instruction, intervention, and extension through the use of the Assessment Generator. This tool allows the teacher to create assessment materials based on learning levels. For example, a teacher can create an assessment at the “Below,” “At,” or “Above” level for each Core Area. The Assessment generator also includes questions at various levels (i.e., 1, 2, 3) for each Core Area.

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- The “Teacher Program Guide Chemistry” provides guidance on how to use information obtained from assessments when planning instruction, intervention, and extension.
    - The materials state if “a student responds correctly, use the Online Library - Assessment tools - choose Level 2 assessment questions for the TEKS being taught (labeled in each lesson plan or scope and sequence documents) and affirm comprehension.”
    - The materials state if “a student responds incorrectly, use the Online Library - Assessment tools - choose Level 1 assessment questions for the TEKS being taught…and discuss answer given with student. Determine if there is a misconception and resolve it… If the problem persists, use an art project from the STEAM Activity reader book for the relevant TEKS.”
    - The materials state if “a student responds with partially correct information - Follow the steps of a student responding incorrectly but expect to solve the problem earlier in the process.”
- Additionally, each lesson plan provides guidance on extension work for each standard within the “Extension Work” section. For example, in lesson 6B, the extension work section provides the guidance, “Protons and neutrons are not fundamental particles. Protons and neutrons are thought to consist of quarks. Research quarks and explain the difference between protons and neutrons in terms of quarks.”

Materials provide a variety of resources and teacher guidance on how to leverage different activities to respond to student data.

- Materials provide resources on how to leverage different activities to respond to student data in the “How to Help RTI Students” section within the lesson on “TEKS 6A” states, “Use Online Library - Assessment generator and have students respond to Level 1 and 2 questions. Discuss responses in detail. If students respond accurately, no further additional activities are required. If students provide partial or whole inaccurate answers, assign a mentor to review the lesson content at the student’s pace.” The materials include further instructions on what to do if students still provide partial or whole inaccurate answers. For example, the lesson on “TEKS 6C” in the section “How to Help Special Education Students” states, “Use the stories and activities from the G8 teacher and student books, Chapter 5 Forces of the Universe.”
- The materials provide a “Support Matrix” Excel file, which provides guidance on how to respond to student data by offering additional projects for each standard but does not guide teachers in how to respond to data. For example, all TEKS outside of 9A can be developed through 2 projects; “STEAM Activity Guide - Grade 8 Teacher Edition - p82 - Should I Stay or Should I Go?” and “STEAM Activity Guide - Grade 8 Teacher Edition - p101 - Workout.”
- Materials do not address student data directly, i.e., there are no guidance documents provided for how to use the data taken from assessments or group students based on content mastery. The Assessment Generator provides the ability to see the answer choices of each question to calculate the percentage of multiple-choice questions, but a guide is not provided for open-ended questions that may be partially correct. The teacher program guide does include general instructions for the use of different resources to respond to student data.
- Materials provide limited guidance on how to leverage different activities to respond to student data is limited. The Intervention Focus Tutorial includes the same text and graphics from the student textbook.

TPS STEAM into Chemistry

Indicator 6.3

Assessments are clear and easy to understand.

1	Assessments contain items that are scientifically accurate, avoid bias, and are free from errors.	PM
2	Assessment tools use clear pictures and graphics that are developmentally appropriate.	M
3	Materials provide guidance to ensure consistent and accurate administration of assessment tools.	M
4	Materials include guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned to learning goals.	PM

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Assessments are somewhat clear and easy to understand.

Assessments contain scientifically accurate items that avoid bias but are not free from errors. Assessment tools use clear pictures and graphics that are developmentally appropriate. Materials provide guidance to ensure consistent and accurate administration of assessment tools. Materials include some guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned with learning goals.

Evidence includes but is not limited to:

Assessments contain items that are scientifically accurate, avoid bias, and are free from errors.

- The assessments contain scientifically accurate items that avoid bias but are not free from errors. For example, the assessments avoid bias as the assessment generator for each Core Area includes the option for above, at, and below-level questions and formatting for open-ended, multiple choice, or both question types.
- The assessments are scientifically accurate. For example, the assessment generator for Core Area 1 includes the question, “In the modern periodic table, elements are placed in order of increasing atomic number. How are elements ordered in Mendeleev’s periodic table?” and includes the answer choices, “a) increasing atomic mass number, b) increasing atomic weight, c) increasing reactivity, d) increasing number of electron shells.”
- The assessments include grammatical and spelling errors. For example, a “Core Area 2: Atomic Theory” question prompts students to “State 3 difference between the plum pudding model and the modern atomic model.” The prompt uses "difference," which does not agree with the plural subject of the sentence. Additionally, within “Core Area 2: Atomic Theory,” questions 6-9 contain formatting errors within the answer choices' scientific notation. For example, question 6 reads as 4.25 x10^{1} ^{4}Hz.
- The assessment generator for “Core Area 3: Structure and Bonding” includes several questions listing nonmetals as being in Groups 6 and 7 on the periodic table rather than 6A or 16 and 7A or 17. For example, a question on the above level assessment states that Chlorine is a Group 7 element instead of a 7A or 17 element. Labeling this nonmetal in this manner may confuse the learner about the exact location of the element on the periodic table.

TPS STEAM into Chemistry

Assessment tools use clear pictures and graphics that are developmentally appropriate.

- Assessment tools use clear pictures and graphics that are developmentally appropriate. For example, the assessment generator for “Core Area 3: Structure and Bonding” includes a picture of a trigonal planar model that is clear and easy to view, including a label of the angle of the bonds.
- The assessment generator for “Core Area 2: Atomic Theory” includes a picture of a Lewis dot diagram of carbon dioxide that is clear and correctly depicted.
- The assessment generator for “Core Area 9: Thermodynamics” includes several questions related to a graph. The graph is clear, and the graphic is developmentally appropriate, as it has to do with thermochemistry.
- The “Core Area 10: Nuclear Phenomena” assessment generator includes several questions relating to a “simplified diagram of a stability curve.” The diagram has labels on the x-axis and y-axis, as well as a key showing which line represents radioactive and which represents nonradioactive.

Materials provide guidance to ensure consistent and accurate administration of assessment tools.

- Materials provide clear guidance for teachers to consistently and accurately administer assessment tools. For example, the “Teacher Program Guide High School” includes information on when assessments should be administered. For instance, “By TEKS, by Chapter assessment questions: Students answer questions at the end of each chapter.” and “Benchmark 1 test - to assess natural knowledge at the commencement of term prior to any content of the program being taught.”
- The materials in the “Teacher Textbook” in Lesson TEKS 12A state, “Use the online library - Interactive software tool. Design questions and answers to assign to individual students about the contents of TEKS 12A. Load questions and have students complete homework. Return to the assessment generator and do level 2 and then 3, repeating the process.”
- The “How to use the program guide” states, “continually assess your students using the assessments provided in the printed books and online assessment tools. You have an assessment guide that houses aligned content which can be set as homework or used within the classroom. It includes lesson plans for scientific reasoning and safety.”
- The “Pacing/Year Planner Chemistry” includes “revision, assessment, and reteach” days that the teacher can use to plan out summative assessments by Core Area.

Materials include guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned to learning goals.

- Materials lack guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned to learning goals. For example, materials lack suggestions for time, scheduling, or setting accommodations that would allow students of varied needs and abilities to demonstrate course-level mastery.
- Materials offer a wide range of assessments, allowing students to demonstrate mastery of knowledge and skills aligned to learning goals in various ways, including open-ended responses, projects, performance tasks, and multiple-choice questions. However, materials lack guidance for accommodating students with linguistic, neurodivergent, or other needs on assessments throughout the program. Teacher guidance presented as Tips for ELL Students and Tips for Response to Intervention (RtI) Support mentions help with reading student-facing text but does

not include guidance to provide oral administration or other accommodations, such as blank graphic organizers or access to dictionaries.

- The materials offer modifications for assessment tools so that students of all abilities can demonstrate mastery of learning goals. There is also guidance on how to add alternate text for images. For example, when using the Online Assessment Generator, teachers can create assessments with above, below, or at-grade-level questions and reduce the length of the exam with fewer questions to ensure assessment alignment to meet the needs of all students.

TPS STEAM into Chemistry

Indicator 7.1

Materials include guidance, scaffolds, supports, and extensions that maximize student learning potential.

1	Materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved mastery.	M
2	Materials provide enrichment activities for all levels of learners.	M
3	Materials provide scaffolds and guidance for just-in-time learning acceleration for all students.	M

Meet | Score 2/2

The materials meet the criteria for this indicator. Materials include guidance, scaffolds, supports, and extensions that maximize student learning potential.

Materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved mastery. Materials provide enrichment activities for all levels of learners. Materials provide scaffolds and guidance for just-in-time learning acceleration for all students.

Evidence includes but is not limited to:

Materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved mastery.

- The materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved mastery. For example, in the “Teacher Textbook” for “TEKS 6B,” the teacher is instructed to allow additional time “so that students can make their own review cards to contain facts” or “make their own picture glossary cards to contain facts and use for future review/study.” Students can also complete “Response to Intervention” activities, participate in Emergent Bilingual activities, or work on content assigned in the “Online Libraries” to help them achieve mastery.
- The materials provide additional resources for differentiated instruction by including sections titled “How to Help RTI Students,” “How to Help ELL/ESL Students,” and “How to Help Special Education Students.” These sections include references to support materials such as the “Online Library - Intervention Focus Tutorial,” which allows teachers to “assign earlier grade content and review relevant content,” as well as the “Assessment Generator,” to support review of earlier grade level content before building up to grade level questions.
- The materials provide a section for the teacher to address common misconceptions in order to help struggling students master their learning. For example, within the “Teacher Textbook” in “TEKS 1H: distinguish among hypotheses, theories, and laws,” the “Misconceptions” section states that “Students may very well begin the lesson with the misconception that if something is ‘just a theory,’ it has little or no evidence to back it up. The teacher should spend as much time as needed in the starter to this lesson to ensure students understand that this is not how we use the word theory in science.”

TPS STEAM into Chemistry

Materials provide enrichment activities for all levels of learners.

- The materials provide enrichment activities for all levels of learners by including a section in the "Teacher Textbook" titled "Enrichment Activity for ALL Students" at the end of each lesson. For example, the lesson "TEKS 7D: Analyze the properties of ionic, covalent, and metallic substances in terms of intramolecular and intermolecular forces" states, "Have students research and list scientists who have worked on content for TEKS 7D" and "Have students review whether there is a fact sheet in the Online Library - Scientists for their named scientists. If not, have students create a fact sheet and add it to the library."
- The materials provide several "STEAM Arts Projects" that can be used to enrich student learning for all levels of learners. For instance, the "STEAM Art Projects Guide K-12" includes projects relating to specific TEKS students encountered in the "Student Textbook." The project titled "Practicality of Shoes" includes standard 1G, "develop and use models to represent phenomena, systems, processes, or solutions to engineering problems." The purpose of the lesson is to "show how resources can be conserved and recycled properly" by "creating a pair of shoes out of recycled materials." The project includes steps for all students, including "Tips for ELL Students" and "Tips for Response to Intervention (RTI) support." An "Extension" section is also provided for students who are ready to accelerate their learning.
- The materials include sections titled "How to Help RTI Students," "How to Help ELL/ESL Students," and "How to Help Special Education Students." These sections suggest the teacher refer to support materials such as "Online Library - Intervention Focus Tutorial" and "Online Library - Learn by Doing Activity Reader books" to provide scaffolds and support for students who may need additional aid.

Materials provide scaffolds and guidance for just in time learning acceleration for all students.

- The materials include "Help Videos" that align with specific TEKS and are designed to support all students when they struggle or become stuck. For example, Lesson 6D includes a video designed to teach students how to calculate mean isotopic mass. This video includes several problems and worked solutions for students to study.
- The materials include "Key Questions" the teacher can pose during each "Student Task." For example, in the lesson for "TEKS 5B," callout boxes provide the teacher with "Key Questions" for each "Student Task." Questions such as "How can we use the periodic table to predict the properties of an element?" help guide student learning before a teacher demonstration that shows reactions between water and alkali metals.
- The materials provide "Extension Work" to support students who are ready to accelerate their learning. For example, the lesson for "TEKS 6B: Describe the structure of atoms and ions, including masses, electrical charges and locations of protons and neutrons in the nucleus and electrons in the electron cloud" states that students should "Research quarks, and explain the difference between protons and neutrons in terms of their quarks" in order to accelerate their learning.
- The "Horizontal Alignment Chart" includes a section titled "Just In Time Information." This section identifies just-in-time learning acceleration opportunities for students within the content TEKS. The *Teacher Program Guide High School* states, "Teachers will note that just in time learning is available by allocating student access to the relevant style of content they require. For example, students have access to their online textbook and can link into the Alaska suite of products or into the interactive software tool." For example, the just-in-time learning information for Lesson 11D includes "Student Focus Tutorials CHEM TEK 11.".

TPS STEAM into Chemistry

Indicator 7.2

Materials include a variety of research-based instructional methods that appeal to a variety of learning interests and needs.

1	Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content.	M
2	Materials consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one).	M
3	Materials consistently support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation.	PM
4	Materials represent a diversity of communities in the images and information about people and places.	M

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some research-based instructional methods that appeal to a variety of learning interests and needs.

Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content. Materials provide support for flexible grouping (e.g., whole group, small group, partners, one-on-one). Materials somewhat support types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation. Materials represent a diversity of communities in the images and information about people and places.

Evidence includes but is not limited to:

Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content.

- The materials support multiple types of practice to achieve effective implementation. For example, in the “Teacher Textbook - Chemistry, Lesson TEKS 9A,” students begin by viewing a teacher demonstration and answering questions about the demonstration in the “Starter/Hook” section of the lesson. In “Student Task 1,” the students view an equation written on the board and create ball-and-stick models of the reactants in the equation to understand that the equation is unbalanced. “Student Task 2” allows students to write the balanced equation from the unbalanced equation provided on the board in the previous task. “Student Task 3” enables students to practice writing and classifying equations, while “Student Task 4” provides students with the opportunity to conduct a “partial experiment” using magnesium ribbon.
- Materials include opportunities for students to engage in authentic tasks to form mastery of the content. Located within both the “Teacher Textbook” and the “Student Textbook,” “Lesson TEKS 2D” guides the students to conduct an investigation “to find a possible link between the rate at which ice melts and the addition of salt to the ice.” This investigation leads students through the process of designing and evaluating an investigation.

TPS STEAM into Chemistry

Materials consistently support flexible grouping (e.g., whole group, small group, partners, one on one).

- The materials include guidance that supports flexible grouping. For example, in a lesson on 1G, the teacher provides whole group instruction on different types of models. Students then work individually to create a physical or conceptual model of their chosen topic related to the lesson. Students then break into small groups to teach each other their models.
- The materials provide instructional groupings. For example, within the "Teacher Textbook - Chemistry," in "TEKS 4B Student Task 3," "students form pairs in which one person takes the role of the teacher, and the other the role of the student. The teacher uses the Socratic method to guide students through the following questions."

Materials consistently support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation.

- The materials provide some types of practices to demonstrate relative mastery. For example, in a lesson on 2A focused on explaining each type of model and evaluating their strengths and weaknesses. For each learning activity within the lesson, teachers are provided with directions, task outcomes, and key questions to ask to facilitate student learning.
- The materials support some types of practices within each lesson plan included in the "Student Textbook" and "Teacher Textbook." For example, Lesson "TEKS 9A" has the following identified student tasks:
    - Independent practice "Starter/Hook" questions, such as "Why did the mass drop?" are to be answered after the teacher demonstrates baking powder poured into vinegar to activate prior knowledge.
    - Guided discussion about balancing equations, where students answer "what is wrong with this equation" after seeing it written on the board, followed by independent practice with the knowledge and skill that was the focus of the guided discussion.
    - Direct teaching of new knowledge relevant to the focus of TEKS, including "the difference between synthesis, decomposition, single replacement, double replacement, and combustion reactions."
    - Collaboration on an investigation in which students conduct a practical experiment using "different starting masses of magnesium" in order to apply the knowledge and skills being learned in the lesson.
- Lessons contain many student tasks which may be modeled, used for independent practice, or guided through lecture/slide presentations though, consistent guidance is not evident throughout the program. Materials provide minimal guidance and limited structures for effectively implementing collaborative work. For example, for enrichment in the lesson for "TEKS 12D: Predict products in acid-base reactions that form water," students can "work in pairs and review one another's homework content" and "teachers guide students to have accurate content to use for future study." Although there is some guidance here, it is not adequate to achieve effective implementation. Other lessons have no guidance at all to support teachers in implementing any form of practice. For example, in the Teacher textbook, Chemistry Lesson 6E, student task 1-4 has students using templates to model how electrons are placed around atoms, then move to review the term valence electrons, create a model for atoms, where the teachers are given some guidance to model the process for students. In student task 5, students are tasked with making Lewis dot diagrams of individual elements, and the Lewis dot structure of one of the molecules from task 4. There is no guidance given in the lesson plan to support multiple types of practice.

TPS STEAM into Chemistry

Materials represent a diversity of communities in the images and information about people and places.

- The materials include a “Research History” section within each lesson that includes information about people and places. For example, in the lesson on “TEKS 1E and 1F” within “Student Textbook,” the “Research History” section includes a passage for students to read on Marie Curie, which states that she was “the first (and at the time of writing, only) woman to win Nobel Prizes in two different fields (chemistry and physics).” Other scientists, such as Antonine Lavoisier and German scientist August Wilhelm von Hofman (to name a few), are also discussed in the “Research History” sections within the “Student Textbook.”
- The materials provide an “Online Library - Scientists” resource that includes a collection of fact sheets for all scientists presented in the student/teacher textbooks. Each fact sheet includes the name of the scientist as well as a picture, the nationality, date of birth, date of death, and key facts. For example, “Scientists Fact Sheet 1” includes an American scientist named Shirley Jackson and states, “She was one of the first African American students to attend MIT and became the first woman to receive a Ph.D. in physics from MIT.” Also included is Stephen Hawking, whose “writing and lecturing still continue with the assistance of an adaptive communication system.”
- The materials include an “SMSC Opportunities” section that states, “Students should consider the diversity of scientists, the impact of their work, and any cost-benefit analysis they may have had to consider in their work.”

TPS STEAM into Chemistry

Indicator 7.3

Materials include listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting course-level science content expectations.

1	Materials include guidance for linguistic accommodations (communicated, sequenced, and scaffolded) commensurate with various levels of English language proficiency as defined by the ELPS.	PM
2	Materials encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English.	M

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting course-level science content expectations.

Materials include some guidance for linguistic accommodations (communicated, sequenced, and scaffolded) commensurate with various levels of English language proficiency as defined by the ELPS. Materials encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English.

Evidence includes but is not limited to:

Materials include guidance for linguistic accommodations (communicated, sequenced, and scaffolded) commensurate with various levels of English language proficiency as defined by the ELPS.

- Materials list the ELPS in the *Teacher Program Guide High School* and note that the content of program components is intended to align with both TEKS and ELPS for each grade level. The Program Components section lists ELL supports as a feature of each lesson in the *Teacher Textbook* and provides examples of excerpts from grade-level lessons. These excerpts indicate that the generic guidance to support ELL students within lessons does not correspond to language domains or proficiency levels. This overview document lacks further information on guidance for linguistic accommodations commensurate with various levels of English language proficiency as defined by the ELPS.
- Materials include guidance for linguistic accommodations under the "How to Help ELL/ESL Students" header at the end of each lesson in the Teacher Textbook. The *Teacher Program Guide High School* states that this section only includes information for teachers to assist ELL/ESL students in delivering of the specific lesson plan content. The arrowed box states, "Science language master is vital. Have students list the keywords from the TEKS and create their own picture glossary review cards. Ask students to use the words in sentences and resolve any misconceptions. Add to the science word wall for the classroom and maintain it throughout the school year." For example, in the Lesson 10A resource "How to Help ELL/ESL Students," teachers are guided to "Ask students to use the words in sentences and resolve any misconceptions."
- While the materials have an "ELPS Activity" section in addition to the "How to Help ELL/ESL Students" section, they are not commensurate with various levels of English language

proficiency as defined by the ELPS. For example, the "ELPS Activity" in Lesson 6D states, "Throughout this lesson, work with students to edit their own writing. Students should understand that self-editing, as well as peer-editing, is an extremely important part of learning to write effectively and efficiently. Work with students to practice editing their own and their peers' writing for standard grammar usage, including subject-verb, pronoun, and verb tense agreement." While this statement addresses writing, it does not differentiate the various proficiency levels as defined by the ELPS.

- Guidance in the "How to Help ELL/ESL Students," further states to "use Archway, a phonics program provided in the Online Library" and "have students complete the RTI activities." The materials include teacher guidance for communication with emergent bilingual (EB) students using online resources with the goal of creating comprehensible input. Teachers have access through the online library to Archway, which is a phonics program to help whole families arriving in a school district learn to read, write and speak English in a short period of time. While these activities as a whole meet the needs of students at all levels, they do not provide linguistic accommodations that commensurate with various levels of English language proficiency as defined by the ELPS.

Materials encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English.

- Throughout the program components, materials encourage the use of students' first language and use it as a means for linguistic, affective, cognitive, and academic development in English. Materials primarily offer guidance on native language use through mentoring, translations, and the Spanish glossary. For example, the materials include a" How to Help ELL/ESL Students" section in all chapters that provides guidance on supporting EB students.
    - In Lesson 4B, the materials state, "Have students create their own scientist fact sheet in their first language to mirror the content of a chosen scientist, either from their own research or using the Online Library - Scientists Content."
    - In Lesson 5B, the materials state, "Have students create test questions and answers in their first language about the contents of this TEKS that they can swap with another same-language student. Have the pair work together to grade one another's responses and then make any required edits before asking them to put them into English. Once in English, have another student pair in the class attempt to answer the questions."
    - Lesson 5B also states, "Continual use of scientific language, initially in the first language, and then into English will assist students in learning more quickly."
    - For example, in the online library, teachers have access to a blackline master section with a Spanish glossary to support students who speak Spanish with translation.
    - For example, materials provide suggestions for working with ESL/ELL students; for example, the Teacher Text states, "If possible, have students work in collaborative groups where students share the same languages, and ideally, one student is advanced in English. Use visual and tactile models to illustrate elements of each activity and focus on the keywords. You can have students create a journal of words in their first language and in English."

TPS STEAM into Chemistry

Indicator 7.4

Materials provide guidance on fostering connections between home and school.

1	Materials provide information to be shared with students and caregivers about the design of the program.	M
2	Materials provide information to be shared with caregivers for how they can help reinforce student learning and development.	M
3	Materials include information to guide teacher communications with caregivers.	M

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials provide guidance on fostering connections between home and school.

Materials provide information to be shared with students and caregivers about the program's design. Materials provide information to be shared with caregivers for how they can help reinforce student learning and development. Materials include information to guide teacher communications with caregivers.

Evidence includes but is not limited to:

Materials provide information to be shared with students and caregivers about the design of the program.

- The materials include a “Family/Caregiver Guide: High School” that informs caregivers about the program's design. For example, the materials provide a program introduction section that includes sections on “philosophy of science teaching and learning,” “research-based strategies,” and “family support.”
    - The “Philosophy of science teaching and Learning” section includes information from the program about the importance of teaching science. For example, the materials state, “Whether or not a student pursues a science-related career, they will continually confront scientific arguments, advances, and associated technologies in their daily lives.”
    - The “research-based strategies” section includes information from the program about the pedagogy used in the science classroom. For example, this section states, “Research shows how a sense of belonging in rich and rigorous classrooms is directly correlated to student's long-term academic success.” (Marten 2022) and “Students learn best by doing.”
    - The “Family Support” section includes information from the program about how “parents/caregivers can help enforce some of the requirements of the TEKS at home.” The program includes a “Family Guide” for each science course, including chemistry.

TPS STEAM into Chemistry

Materials provide information to be shared with caregivers for how they can help reinforce student learning and development.

- The materials include a “Family/Caregiver Guide High School” that provides information to be shared with caregivers for how they can help reinforce student learning and development in the “Family Support” section.
    - For example, the materials state, “Parents/caregivers can help enforce some of the requirements of the TEKS at home. The work you can complete with their children will vary between assisting students studying new TEKS content and explaining how it applies to home life and practical assistance with safety measures.”
    - The materials also “ask family members to review all new terms and definitions with students at home and identify how they are useful in their daily lives.”
- Some lessons include activities that can be shared and completed with caregivers at home to reinforce student learning and development. For example, in the “Student Textbook,” Lesson TEKS 9C includes a “Student Focus Exercise” that prompts students to take home a piece of writing they have read in the class recently and then work with “parents/guardians to create a graphic organizer or illustration about your text.”

Materials include information to guide teacher communications with caregivers.

- In the *Online Library - HS Teacher Support*, materials provide the Science Report Card as a teacher resource. This resource includes the following guidance for teacher communications with caregivers: “Please fill in the parent comment section so that we can work together to monitor your child’s progress.” The Science Report Card contains rows and columns for teachers to communicate student progress toward mastery of science and literacy standards according to four levels: Novice, Intermediate, Expert, and Not Yet Introduced.
- Materials include teacher guidance for communicating with caregivers in the *Family/Caregiver Guide High School*. This guidance includes advice for building relationships and sharing digital resources. For example, materials share the free online materials caregivers have access to. Stating, “Digital family access costs nothing: [The program Publishing Inc provides parents digital access to families for all homework assignments and lists of keywords and definitions. [The program] can be booked to run workshops to assist parents and teachers, work together on safety standards and other areas such as literacy, where parents can help students master good practice and science, mathematics and literacy content."
- The *Teacher Program Guide High School* offers additional information to guide teacher communication with caregivers, including suggestions for engaging caregivers as partners in the student’s education. For example, materials state that parents/caregivers can help master the TEKS at home by “assisting students studying new TEKS content and explaining how it applies to home life” and providing “practical assistance with safety measures.”

TPS STEAM into Chemistry

Indicator 8.1

Materials include year-long plans with practice and review opportunities that support instruction.

1	Materials are accompanied by a TEKS-aligned scope and sequence outlining the order in which knowledge and skills are taught and built in the course materials.	M
2	Materials provide clear teacher guidance for facilitating student-made connections across core concepts and scientific and engineering practices.	M
3	Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.	M

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include year-long plans with some practice and review opportunities that support instruction.

Materials are accompanied by a TEKS-aligned scope and sequence outlining the order in which knowledge and skills are taught and built in the course materials. Materials provide some teacher guidance for facilitating student-made connections across core concepts and scientific and engineering practices. Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.

Evidence includes but is not limited to:

Materials are accompanied by a TEKS aligned scope and sequence outlining the order in which knowledge and skills are taught and built in the course materials.

- The material includes a section titled “Chemistry Scope and Sequence” that includes units by name, Chemistry Texas Essential Knowledge and Skills, as well as textbook references. This information is also provided under the STEAM into Chemistry TEKS Correlations section, which includes the TEKS, expectations, audience, and textbook page numbers.
- The scope and sequence in the Teacher Textbook provides the suggested number of class lessons with minutes per sub-unit. For example, at the beginning of the lesson on TEKS 1A, the Pacing and Class Information section says, “This lesson will require 50 minutes to complete.”
- Materials provide the teacher with a pacing guide that organizes the scope and sequence into the school year, including which lesson should be taught on which day for the entire year in a calendar-style format.

Materials provide clear teacher guidance for facilitating student made connections across core concepts and scientific and engineering practices.

- Materials in the Teacher Textbook provide the teacher with a lesson plan for each of the TEKS covered in a topic. The materials also provide a “Chemistry - TEKS 1–4 Guide” that shows where the Science and Engineering Processing TEKS are located within each component, such as the student textbook or the teacher textbook. This list also includes page numbers as well as lesson titles for reference.
- The Teacher Textbook provides Learning Activities that include a starter/hook, a teacher background, several student tasks, misconceptions, open inquiry work, homework, and key

questions for each section of the lesson. Within these sections, there are clear student directions, as well as teacher guidance, such as, “Students should be reminded that chlorine has a mean atomic mass of 35.5 due to the presence of isotopes. This is a fantastic opportunity to review how the mean atomic mass of an element is calculated.”

Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.

- The student textbook shows students their prior knowledge by listing the standards with which they should be familiar. The standards listed are previous chemistry TEKS that the student was exposed to earlier in the course. For instance, in the TEKS 1H, the prior knowledge section states, “(1F) organize qualitative and quantitative data using scatter plots, line graphs, bar graphs, charts, data tables, digital tools, diagrams, scientific drawings, and student-prepared models….”
- Student tasks located in the Student Journal provide key reflective questions such as Student Task 3: “Why are control groups important?” These questions direct students to review their work on previously completed student tasks and conduct research into previously explored topics.
- The teacher textbook contains “prior knowledge” sections within each lesson that list the previous lessons’ TEKS. For example, in TEKS 2B, the prior knowledge section states, “(E) collect data using the International System of Units (SI) and qualitative data as evidence; (F) organize qualitative and quantitative data using oral and written lab reports, labeled drawings, particle diagrams, charts, tables, graphs, journals, summaries, or technology-based reports.”
- In Lessons 1G and 2A, students learn to make and evaluate models to represent processes. This practice spirals through the year as they are asked to evaluate models every time they make one. For example, the teacher textbook states, “Student Task 3: Students are given a range of materials from which they can produce physical models to represent how the atomic model has changed over time. These should include 1. Dalton’s atomic model, with an explanation of his postulates. 2. Thompson’s plum pudding model. 3. Rutherford’s atomic model 4. Bohr’s nuclear atom, along with an explanation of how the Heisenberg uncertainty principle causes problems for Bohr’s model. Students should fully label each model and explain their strengths and limitations.”

TPS STEAM into Chemistry

Indicator 8.2

Materials include classroom implementation support for teachers and administrators.

1	Materials provide teacher guidance and recommendations for use of all materials, including text, embedded technology, enrichment activities, research-based instructional strategies, and scaffolds to support and enhance student learning.	M
2	Materials include standards correlations, including cross-content standards, that explain the standards within the context of the course.	M
3	Materials include a comprehensive list of all equipment and supplies needed to support instructional activities.	M
4	Materials include guidance for safety practices, including the course-appropriate use of safety equipment during investigations.	PM

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some classroom implementation support for teachers and administrators.

Materials provide teacher guidance and recommendations for use of all materials, including text, embedded technology, enrichment activities, research-based instructional strategies, and scaffolds to support and enhance student learning. Materials include standard correlations, including cross-content standards that explain the standards within the context of the course. Materials include a comprehensive list of all equipment and supplies needed to support instructional activities. Materials include some guidance for safety practices, including some of the course-appropriate use of safety equipment during investigations.

Evidence includes but is not limited to:

Materials provide teacher guidance and recommendations for use of all materials, including text, embedded technology, enrichment activities, research based instructional strategies, and scaffolds to support and enhance student learning.

- The STEAM into Chemistry teacher textbook contains a program guide that guides teachers on how to use the materials. The online library HS Teacher Support contains a Teacher Program Guide that has the program components as well as technology lessons.
- Materials provide the teacher with guidance on how to implement scaffolds to support and enhance student learning. For example, in the lesson plan for TEKS Chemistry 1H, the materials provide suggestions for how the teacher can provide extension work, address misconceptions, help Response to Intervention (RI) students, Emergent Bilingual (EB) students, and Special Education students, as well as enrich all students.
- Materials offer explanations of the research-based instructional strategies used throughout the text, such as suggestions for how to implement strategies like “Inquiry” into lessons. Research-based strategies are also listed under the title “How to Help ELL/ESL students” within each lesson in the “High School Teachers Program Guide.”

TPS STEAM into Chemistry

Materials include standards correlations, including cross content standards, that explain the standards within the context of the course.

- Science standards correlations for unit lessons or activities can be found in the Teacher Textbook at the top of each lesson. Learning objectives and Texas Chemistry Standards can also be found in the Texas Standards Science Chemistry Scope and Sequence, where it states, “The chemistry skill standards are embedded through these lessons, but there are also explicit lessons for delivery of these skills.”
- Teacher Background is provided at the beginning of each lesson. The Teacher Background section includes information about what students were introduced to in previous lessons as well as what they will be introduced to in this lesson. For example, in Chemistry 2A, the Teacher Background states, “In previous lessons, students have been introduced to the difference between physical, conceptual, and data-based models. In this lesson, they will identify the advantages and limitations of different models.”
- Materials provide a Chemistry TEKS correlation chart that shows where each TEKS is addressed by the materials. For example, the correlation guide shows that TEKS 9.A is addressed by the materials in a student activity in the Student Chemistry Textbook.
- The materials provide a “Chemistry- Arts Math ELA Cross Reference” document that shows where the cross-cutting TEKS connect with the Chemistry Teacher Textbook, STEM Arts Guide K-12, and the online library. It includes “TEKS code, Breakout wording, Component, Lesson Title/Location, and page number.”

Materials include a comprehensive list of all equipment and supplies needed to support instructional activities.

- A list of equipment and supplies can be found in the STEAM Kitting/Materials List for Chemistry within the Online High School Teacher Support section. Each high school lesson comes with a resources section that details the equipment needed by the students within the lesson. For example, the Teacher Textbook includes a “Resource” section that lists required materials for the lesson, such as tongs, a microbalance, magnesium, a crucible, a Bunsen burner, a tripod, a heat-proof mat, and worksheets.
- The materials include a list of equipment and supplies needed to support the STEAM Arts Projects for the Chemistry curriculum. For example, in the STEAM Arts Project Guide K-12, materials offer a comprehensive list of supplies per art project.

Materials include guidance for safety practices, including the course appropriate use of safety equipment during investigations.

- The materials reference the Texas Science Safety Standards in the Planning Investigations document. This document is in the Online Library - Student Reasoning Library - Scientific Investigation and Reasoning Handbook. The document states, “Safety information is vital for all types of investigations. Teachers can review and apply/have students apply classroom, laboratory, and field investigation requirements by viewing and applying the Texas Safety Standards.”
- Materials provide guidance for safety practices and the use of grade-appropriate equipment for labs. For example, materials provide lessons that address Chemistry TEKS 1D, the skill for using appropriate tools such as safety data sheets, computers and probes, electronic balances, volumetric flasks, and other grade-level appropriate equipment. While the materials provide a

lesson on safety practices and precautions, as well as some student guidance, they do not provide specific safety practices guidance for teachers to follow during investigations throughout the course.

- Curriculum materials include some student guidance for identifying safety practices. Learning activities state that students should be reminded of Texas Education Agency-approved safety standards, perform a risk assessment, and use appropriate safety equipment for all investigations in this course. Guidance is generally given to students through the "Risk-Assessments," where students are asked, "What chemicals are we using? What hazards are associated with these chemicals?" Students then use knowledge from lesson 1C to identify lab safety precautions. Although there is general guidance for students, there is no guidance for teachers.

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Indicator 8.3

Materials provide implementation guidance to meet variability in program design and scheduling.

1	Materials support scheduling considerations and include guidance and recommendations on required time for lessons and activities.	M
2	Materials guide strategic implementation without disrupting the sequence of content that must be taught in a specific order following a developmental progression.	M
3	Materials designated for the course are flexible and can be completed in one school year.	M

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials provide implementation guidance to meet variability in program design and scheduling.

Materials support scheduling considerations and include guidance and recommendations on required time for lessons and activities. Materials guide strategic implementation without disrupting the sequence of content that must be taught in a specific order following a developmental progression. Materials designated for the course are flexible and can be completed in one school year.

Evidence includes but is not limited to:

Materials support scheduling considerations and include guidance and recommendations on required time for lessons and activities.

- The teacher textbook contains a scope and sequence for chemistry that provides recommendations for the pacing of activities. The materials guide the teacher on time for each lesson by stating, “This lesson requires 50 minutes to complete.”
- The materials include a chart with the number of class periods, Texas Chemistry Standards, and textbook references in the “Texas Standards - Science Scope and Sequence” section with the teacher textbook.

Materials guide strategic implementation without disrupting the sequence of content that must be taught in a specific order following a developmental progression.

- There is a scope and sequence provided in the introduction that includes recommendations for the pacing of activities. The activities are structured in a sequential manner. For example, Core Area 2, “Atomic Theory,” is followed by Core Area 3, “Structure and Bonding.”
- Teachers can reference a calendar view in the Pacing/Year Plan Chemistry. The calendar guides the teacher through the 2024 school year by including the days to teach skill standards, core areas, and revision days.
- Pacing and Class information is provided in the teacher textbook within each lesson and includes the “average time needed for completed delivery of lesson content.”

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Materials designated for the course are flexible and can be completed in one school year.

- The materials guide gives a sequence of learning activities within the "Learning activities" section in the “Teacher Textbook.” Teachers are provided with detailed lesson plans that include teacher background, lesson objectives, keywords, prior knowledge, expository text for students, learning activities, and homework. The Teacher Program Guide provides information about personalized services for the teacher. The materials state, "Our team will assist you in amending the plans, should you have special requirements for individual students.
- The Teacher Program guide states, "By using the assessment tools teachers can assess student comprehension daily and the sequence of lessons and pacing can be adjusted to suit individual classes."
- A calendar is provided in the Pacing/Year Plan for the 2024 school year. This allows teachers to view how to complete the course within one school year.

TPS STEAM into Chemistry

Indicator 9.1

The visual design of materials is clear and easy to understand.

1	Materials include an appropriate amount of white space and a design that supports and does not distract from student learning.	No
2	Materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting.	Yes
3	Materials include digital components that are free of technical errors.	No

Not Scored

The visual design of materials is somewhat clear and easy to understand.

Materials do not include an appropriate amount of white space and a design that supports and does not distract from student learning. Materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. Materials include digital components that are not free of technical errors.

Evidence includes but is not limited to:

Materials include an appropriate amount of white space and a design that supports and does not distract from student learning.

- The materials are text heavy though include much white space. Student materials generally incorporate an appropriate amount of white space and a design that does not distract from student learning. To distinguish sections from each other, titles and headings are prominent and clear; sections are marked with subheadings, and content is labeled appropriately. Students can read the text in either single- or double-page mode on the screen. Single page mode allows for the text to be larger and in the center of the screen, and the student can scroll down through the pages. In double page mode, the text shows two pages simultaneously and the student can "flip" through the pages similar to a real book The following pages of the lesson include expository text for students to read that is mostly text, with some pictures and charts to support the reading. The actual text pages in the digital text appear to have an appropriate amount of whitespace. Navigating the current interface may be difficult for students when flipping through pages of the online book, completing reading assignments, and navigating to different components such as labs.
- After the reading, the materials include text-based student tasks, with a sidebar that includes key questions that are also text-based. An appropriate amount of white space is included in the homework section of the student textbook. Student guidance materials are not appropriately designed with clear, designated places for important information. Student's materials are not designed where important information can easily be located for planning, implementation, or reviewing. For example, in the *Student Textbook*, the student must return to the home page and open another window to access a lab, make an assessment, or pull up the Blackline slides. The student must continue to return to the homepage and open and search for what is needed. Students must switch between tabs to access the content.

TPS STEAM into Chemistry

Materials embed age appropriate pictures and graphics that support student learning and engagement without being visually distracting.

- The materials provide age-appropriate visuals and graphics that support learning without being visually distracting. For example: The Student Textbook includes the lesson “TEKS 5A: Explain the development of the Periodic Table over time using evidence such as chemical and physical properties,” which includes two early examples of the periodic table that are visually represented to help the learner to understand the origins of the modern periodic table.
- The materials include labeled pictures within the expository text and research history sections of the Student and Teacher Textbooks. “TEKS 8B” includes a “Research History” section depicting Amedeo Avogadro. This photo includes his name and birth to death dates (1776 - 1856) underneath.
- The Student Textbook includes diagrams, charts, and models to help students visualize concepts. The lesson on “TEKS 6B: Describe the structure of atoms ions, including the masses, electrical charges, and locations of protons and neutrons in the nucleus and electrons in the electron cloud” includes models of atoms depicting the nucleus and electron shells as well as an image depicting an element on the periodic table that includes labels of mass number and atomic number.

Materials include digital components that are free of technical errors.

- The materials are not free of grammatical and spelling errors. For example, the Assessment generator for Core Area 10 Nuclear Phenomena (TEKS 14) includes the question, “An unstable isotope of element isotope of element X has an atomic number of 90. This isotope emits beta radiation. What happens to the atomic number?” One of the answer choices has a typo and says, “it increases by 4.”
- The answer key for the Key Questions in “TEKS 11A and 11B” includes a grammatical error. The materials state, “In some circumstances a solvent maybe a solid or gas.”
- The materials are free of inaccurate content materials or information. The Student Textbook and Teacher Textbook contains “Expository Text for Students,” which is accurate. For example, the “Expository Text for Students” in “TEKS 4A” states, “In 1811, Johann Friedrich Meckel made the prediction that during the development of a human embryo, gill slits would be present. This prediction proved to be correct, but his scientific explanation was far from correct.”
- The materials are free of wrong answer sheets to problems. For example, the Teacher Textbook includes an “Answer Key” for the “Student Tasks” and “Homework.” The answer key for “TEKS 9D” includes the question, “How do observations of the flask tell us what the limiting reactant was?” and includes the answer, “If all of the baking soda dissolved, the limiting reactant is baking soda. If some baking soda remains, the limiting reactant is vinegar.”

TPS STEAM into Chemistry

Indicator 9.2

Materials are intentionally designed to engage and support student learning with the integration of digital technology.

1	Materials integrate digital technology and tools that support student learning and engagement.	Yes
2	Materials integrate digital technology in ways that support student engagement with the science and engineering practices and course-specific content.	No
3	Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate.	No
4	Materials integrate digital technology that is compatible with a variety of learning management systems.	No

Not Scored

Materials are somewhat intentionally designed to engage and support student learning with the integration of digital technology.

Materials integrate digital technology and tools that support student learning and engagement. Materials do not integrate digital technology in ways that support student engagement with the science and engineering practices and course-specific content. Materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. Materials do not integrate digital technology that is compatible with a variety of learning management systems.

Evidence includes but is not limited to:

Materials integrate digital technology and tools that support student learning and engagement.

- The materials integrate technology and tools that support student learning and engagement. The materials include digital access to components and online assessments and tutorials, digital technology, and tools.
    - For example, student digital components include a digital journal where answers to questions in the task activities can be written, homework can be completed, and vocabulary notes can be taken.
    - The materials offer an Interactive Online Assessment Tool that provides students with TEKS-focused questions. The tool prompts the student to answer a question, provides answer choices, and then provides feedback to the student. The feedback informs the student of the correctness of their answer choice.
    - The materials include the Online library and NEST Family Videos, where teachers and or students can watch and discuss movies. For example, the materials include help videos for several TEKS, including videos for “Chemistry 6D Isotopic Mass,” “Chemistry 9B Acid-Base Reactions,” “Chemistry 8A Moles and Grams,” “Chemistry 6C Photon Frequency,” and “Chemistry 9A Balancing Equations.”
    - The materials provide digital slides that align with the Student Tasks in the Teacher and Student Chemistry Textbooks. For example, the Student Tasks for Lesson 2B and 2C integrate with the digital slides for Unit 2 TEKS 2B + 2C. Student Task 1 in the “Teacher Textbook” states, “The teacher shows students the information on slide 2. This slide

contains test scores from two different classes with two different teachers. The teacher should ask the students to determine which class they think performed the best by just looking at the data."

Materials integrate digital technology in ways that support student engagement with the science and engineering practices and course specific content.

- The "High School Chemistry Slides" support student engagement with science and engineering practices (SEPs) within the SEP lessons (TEKS1-4). For example, the online textbook lesson for TEKS 4C includes student tasks that support engagement with science and engineering practices, such as researching and communicating ideas and connecting the lesson to the slides. The materials state, "Students explore the online platforms and evaluate their educational value and for information on STEM careers. Slide 2 contains a template they can use during their evaluation. The list of online platforms on slide 3 is just a range of suggestions that the teacher can add to." Lesson 4C is a lesson in which students are given the opportunity to explore and evaluate a wide range of online platforms for future use in the course. In this book, there are multiple opportunities for students to research using ICT facilities where these platforms can be used.
    - While this activity integrates digital technology that supports student engagement with science and engineering practices, any of the activities that integrate science and engineering practices come from the SEP lessons, which do not have course-specific content.

Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate.

- The materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate.
    - The materials include "High School Chemistry Slides" for each unit that encourage collaboration. However, the materials do not integrate digital technology to do so. For instance, the slides for lesson "TEKS 2A" include the chemical symbol for magnesium, and the "Teacher Textbook" states, "Students should discuss the advantages and limitations of such symbols when it comes to conveying information about atomic structure." This activity allows students to collaborate with each other but does not integrate digital technology to do so.
    - The materials offer face-to-face collaboration but do not include an online platform for students to discuss questions and content with each other or with the teacher. There is no digital technology which provides opportunities for students to collaborate such as, a discussion board, video conferencing tools, or other means of using digital technology to collaborate.

Materials integrate digital technology that is compatible with a variety of learning management systems.

- The materials do not integrate digital technology that is compatible with a variety of learning management systems but do note that all digital materials are accessible via any computer or mobile device with the internet. The materials recommend internet use for much research-focused activities in student-facing materials.

- The *Teacher Program Guide High School* states that digital technology within the materials is compatible with Clever but does not mention other learning management systems.

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Indicator 9.3

Digital technology and online components are developmentally and course-appropriate and provide support for learning.

1	Digital technology and online components are developmentally appropriate for the course and align with the scope and approach to science knowledge and skills progression.	No
2	Materials provide teacher guidance for the use of embedded technology to support and enhance student learning.	No
3	Materials are available to parents and caregivers to support student engagement with digital technology and online components.	Yes

Not Scored

Digital technology and online components are somewhat developmentally and course-appropriate and provide some support for learning.

Digital technology and online components are not developmentally appropriate for the course and do not align with the scope and approach to science knowledge and skills progression. Materials do not provide teacher guidance for the use of embedded technology to support and enhance student learning. Materials available to parents and caregivers to support student engagement with digital technology and online components.

Evidence includes but is not limited to:

Digital technology and online components are developmentally appropriate for the course and align with the scope and approach to science knowledge and skills progression.

- The digital technology and online components are not developmentally appropriate for the course. For example:
    - The course is organized sequentially with the TEKS; therefore, it is aligned with the scope and approach of the knowledge and skills progression.
    - Some of the digital components are not developmentally appropriate for the course. For instance, the “Learn by Doing Activity Readers” are within the TPS online library but are designed for K-8 students.
    - The materials include a “Student Reasoning Library - Scientific, Investigation and Reasoning Handbook” that includes reasoning guides for Forensic Science and grades K-8 but does not include Chemistry.

Materials provide teacher guidance for the use of embedded technology to support and enhance student learning.

- The materials provide teacher guidance for the use of digital components but do not include embedded technology to support and enhance student learning. For example:
    - The “Teacher Program Guide: High School Courses” includes a section titled “Support Notes for Teachers” that provides guidance on how to use digital tools, such as the assessment generator. The materials state, “The digital tools provide content by TEKS by level, and the assessment generator includes questions for ELPS also. Teachers can use

the results from the level assessments to know which students need which content, and pacing plans can be adjusted accordingly." While this provides guidance for using digital components, these components are not embedded in the content.
    - The lesson on "TEKS 4C" suggests that students should access "the online research library" to find peer-reviewed journals. The materials do not embed a live link to this resource. Instead, students must access this library by exiting the textbook and returning to the menu, where they can click on the appropriate resource.
    - The "How to Use the Program" guide explains to the instructor how to use the various digital components of the program. However, these components are not embedded in the materials. For instance, this guide states, "Use textbook content, which is a mixture of expository text, investigations, and activities. You can use the research and careers content for homework in place of or in addition to the homework detailed." The materials do not embed this technology into the textbook for ease of use, as the digital components are isolated from each other.

Materials are available to parents and caregivers to support student engagement with digital technology and online components.

- Materials are available to parents and caregivers to support student engagement in online components.
    - For example, the *Family/Caregiver Guide High School* states that teachers and caregivers should communicate so that digital access to the curriculum is provided for the student at home. Materials provide caregivers with access to online resources, including but not limited to homework, TEKS and ELPS correlations, glossary cards, and digital textbooks. This document allows parents and caregivers to support student engagement with online tools like the Intervention Focus Tutorial.
    - For example, materials provide an e-letter that provides online access to materials, resources, and activities to reinforce student learning and development.
    - For example, materials provide access to NEST family videos to support learning at home.