TPS Publishing STEAM into Biology

TPS Publishing STEAM into Biology 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 clear and easy to understand.

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Section 7. Supports for All Learners

- The materials provide 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 a variety of 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 clear and easy to understand.
- The materials are intentionally designed to engage and support student learning with the integration of digital technology.
- The digital technology or online components are developmentally and grade-level 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 to 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 are designed to strategically and systematically 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. For example, Unit 6A of the *Teacher Textbook* tasks students to explore an expository text with guided questions and research that employs students to "research how mistakes during mitosis lead to aging." Another example is on the starter slide, where students are asked to develop questions and theories about blue eyes. The students then go through a series of practice questions about inheritance patterns and predicting outcomes. Also, in Unit 1G, students have opportunities to "independently research and make connections between theory and real-world application of science," "create their models to represent phenomena, systems, processes or solutions to engineering problems," and "use different techniques to help [their] learning...(such as) concept maps to help with reading, asking questions, talking about ideas, and describing things when you do not know the correct words to use."
- The TPS textbook provides an "Expository Text for Students." Like scientists, the students are encouraged to ask questions about phenomena based on their observations. The materials provide biology students with opportunities to develop and practice science and engineering

practices (SEPs). The lesson on DNA structure provides students with questions tapping into prior knowledge. The students are then placed through various student tasks where they have the chance to research DNA structure (task 1), explain how DNA is packaged into chromosomes (task 3), compare competing DNA origins, and create a pro/con list and explain which theory they prefer and why (task 4).

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 strategically develop students' content knowledge and skills as appropriate for the concept and biology course as outlined in the TEKS. The TEKS indicate their location within the text. The materials define TEKS 1A before prompting students to ask questions and make observations that help students learn the information shared in the standard. Materials embed course-level content knowledge and skills within SEPs and recurring themes so students can build and connect knowledge and apply it to new contexts. For example, the pacing calendar infuses skills-based lessons (in which students can strengthen their use of SEPs) between core area instruction to develop depth in their use of scientific and engineering practices throughout the year.
- The materials support teachers in developing student content concepts and skills by giving them resources and cues at varying points in lessons throughout the course. For example, each lesson contains a teacher background section. In Lesson 12B, teachers' guidance includes background information to help them connect new skills (interactions between the transport, reproductive, and response systems in plants) to knowledge from previous lessons (interaction between body systems in animals). Teacher guidance cues teachers to assess students' prior knowledge (slides 4 and 5 have built-in questions). The guidance provides key questions to ask throughout the lesson to assess new learning (e.g., "Can students describe and explain transpiration?"). Teachers are also prompted with possible misconceptions (such as the belief plants may not be able to move) to facilitate them in developing student conceptual knowledge.
- The lessons are designed around 50-minute classes and are to be varied in activity type and stimulus each day. For example, Unit 6B guides teachers in leading students through an expository text reading and questions on cell differentiation and then guides students through producing a flow chart describing the stages of cell differentiation, followed by an activity where students find examples of the future possible uses of stem cells and produce a short writing explaining it.
- The curriculum materials also support the spiraling of content and 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 Unit 1G, after presenting to students what phenomena and models are and their limitations, the curriculum has the teacher facilitate an activity in which students practice developing and using models of their own and having them explore what parts of a phenomenon the model represents as well as what is misrepresented by the model (limitations of the model). The activity is scaffolded throughout, with opportunities for the teacher to provide feedback at checkpoints throughout the unit.
- In the lesson overview section, the materials provide a synopsis of the prior knowledge the student has gained before getting to this lesson with TEKS 2A and 5A. 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.

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

- 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 13C, students engage in an activity to answer the question, “How are decomposer organisms and decomposition involved in the temperature rise?” Similar opportunities occur throughout the course; in this particular lesson, students write their findings. Additionally, in Unit 5A, students have opportunities to work collaboratively in groups, as well as work with built-in practice questions and extension questions and classroom discussion opportunities over “which foods the students think contain saturated and unsaturated fats” and “compare and contrast the structure and properties of fatty acids.”
- The online library of teacher support contains a document on planning investigations. This document contains details for teaching students how to plan investigations. The teacher program guide also provides opportunities for teachers to provide resources to parents so that they can reinforce investigation skills at home. For example, in Unit 5D, in the *Teacher Textbook,* teachers are tasked with having students ask questions about spiraling content covered in previous lessons that are relevant to the current lesson and to explore the effects of the 1918 Spanish Flu, such as where it came from and its mechanism of spread.
- 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 found in the *Teacher Textbook*.
- Students conduct classroom labs to test for various biomolecules. In the slide section in a given unit, the students conduct emulsion tests following the instructions on slides 26 and 27, 5A for lipids, and the starch test on slides 22, 5A for carbohydrates.

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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 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 outline for the teacher of 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. In one lesson, students dive into examples of enzymes working inside our bodies. Students then investigate the effect of temperature on the enzyme amylase in a lab setting. Another example is in Lesson 5D, where students learn about viruses. In a practice question, students are asked, "Why is good hand hygiene and covering the mouth and nose when we cough and sneeze important in controlling the spread of diseases like cold and flu? This helps students connect lesson content to their real-world experiences. Additionally, in Lesson 7D, students learn about the real-world application of PCR technology in the identification and diagnosis of the COVID-19 virus; therefore, these phenomena occur across lessons.
- The materials embed phenomena and offer substantial opportunities to explore 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 outlined in the TEKS. For example, in Unit 3A, "Why is Nitrogen Important?" students explore healthy cabbage plants and nitrogen-deficient cabbage plants. Looking at the images, students make observations and propose questions. Later, in Lesson 13C, students study nutrient cycles, including the Nitrogen Cycle, which further develops their understanding of this

phenomenon. Another example is in Unit 5D, where students explore “In what ways are cells and viruses different?” and then are challenged to recall prior knowledge on “What types of biological molecules are common to prokaryotic, eukaryotic cells, and viruses?” A final example is in lesson 10B, where students build on prior knowledge around natural selection learned in the previous lesson. They connect this knowledge to understanding how giraffes adapted at the population level over time. For example, students answer, “The answers of giraffes did not have a spotted pattern. Suggest how and why natural selection caused this.” Later in the lesson, students explain why finishing a course of antibiotics is important even if you are feeling better. In both examples, students must connect to prior lessons to fully answer the question.

- The curriculum has phenomena embedded within the units. For example, phenomena are shared when particle diagrams describe real-world systems and transfers.

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

- The materials leverage students' prior knowledge and accommodate different entry points to learning scientific concepts related to phenomena and engineering practices. For example, in Lesson 6B, students learn about cell differentiation. This leverages students' prior knowledge of the cell cycle and its connection to growth. Throughout the lesson, students are asked open-ended questions (e.g., “How many different types of human cells can you think of?” and “What are possible medical uses of stem cells?”). These questions allow students to access their prior knowledge. The materials provide open-ended examples with possible answers to help them engage with students.
- Each lesson contains support for common student misconceptions to help teachers facilitate learning and address common misconceptions in the unit content, for instance, in Unit 5D of the *Teacher Textbook.* Additionally, in Lesson 4A, students collect and evaluate empirical evidence to test and assess the validity of scientific explanations. The materials provide teachers with a chart to assess the strength or weaknesses of scientific information. The materials also explain possible student misconceptions. Teachers are provided with questions to ask during lesson activities, such as “Why are references important?” that help them identify and respond to student misconceptions using lesson materials. The materials strongly incorporate evidence and phenomenon.
- Student practice questions and opportunities to engage in conversation are embedded in the curriculum materials to help teachers intentionally leverage students' prior knowledge and experiences related to phenomena and engineering practices. Prior knowledge is built into the lessons by showing the reader what TEKS they need to understand already to complete the current lessons. An example of using prior knowledge is showing what students should understand before they begin. Another example is Unit 5D of the *Teacher Textbook*, in which practice problems are provided to the teacher to facilitate conversation and have students recall prior knowledge from middle school vertically aligned TEKS. A final example is in the different sections of Lesson 10. In Lesson 10A, students investigate how natural selection produces changes in populations. Students build upon this knowledge in Lesson 10B and analyze how various strategies, such as producing many offspring, affect natural selection. In Lesson 10C, students build on this knowledge and learn how natural variation may lead to speciation. Finally, in Lesson 10D, students build on everything they have learned to examine other evolutionary mechanisms, such as genetic drift.

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

- The materials identify student learning goals behind each phenomenon across lessons throughout the units of study. Each lesson contains within the teacher's background a section titled “Skills developed in this lesson.” The skills are targeted toward scientific and engineering practices. For example, lesson materials provide a Teacher Background section outlining overarching learning goals for each phenomenon. For example, in Lesson 5B, students learn about the differences between prokaryotic and eukaryotic cells. The teacher background section connects this new learning to the previous day's learning about how cells use certain biomolecules. Another example is Student Task 1, which requires students to review phenomena and answer open-ended questions to critically analyze the concept.
- Materials clearly outline the scientific concepts and goals behind each phenomenon and engineering problem for the teacher, as seen in Unit 5D of the Teachers Textbook. It includes lesson vocabulary, common misconceptions, and prior knowledge reminders for prokaryotic cells, eukaryotic cells, and viruses. Each lesson also has an SMSC opportunities section. In Lesson 5B, for example, students can assess how skills learned in other subjects (such as graphing) can help analyze complex science problems. Students then connect knowledge from previous lessons around the scientific concept of natural selection to collect and analyze data about their classmates' height and ultimately to analyze and evaluate how natural selection produces a change in populations, not individuals. Teachers are provided with guiding questions to help ensure that they teach the scientific concepts behind the data students gather. In another example, the materials provide engineering problem information within the lesson plans as citations and, in addition, provide an Online library - High School Engineering - where students apply their knowledge and build an Electric Motor Vehicle.

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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 connect new learning to previous and future learning goals within units. Each lesson contains the teacher's background, prior knowledge, and connections to other learning. For example, in Lesson 5A on biomolecules, the materials draw on prior knowledge of lipids as fats.
- Materials are designed for students to build and connect their knowledge and skills within units. For example, the materials include a scope and sequence that shows each unit's core learning, TEKS, and textbook connections. For example, Unit 5 covers biological structures, functions, and processes before students move into the mechanisms of genetics. Students learn about the more simple concept of cells before moving on to the systems in the cells that allow for genetic mechanisms.
- The curriculum materials are designed for students to build and connect their knowledge and skills within and across units. The materials include a section for the teacher about the background and the prior learning students must connect to each lesson. The materials help the teacher to build discussions into the lesson about what they should know going in and what they will learn from the lesson. The Teacher Background section helps the students make connections by supporting the teacher in teaching those connections. For example, in Unit 4B, the teacher is guided using prior knowledge from past Unit 4A—“Analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, to encourage critical thinking by the student”—that is

built upon in 4B with “Relate the impact of past and current research on scientific thought and society, including research methodology, cost-benefit analysis, and contributions of diverse scientists as related to the content.”

- Additionally, in Unit 13A (Prior Knowledge), guidance is provided to the teacher to have students recall Unit 10, “Science Concepts- biological evidence. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple mechanisms,” and to use this prior knowledge to “describe some ecological relationships... (and) explain how ecological relationships can affect the stability of an ecosystem.”
- This is also seen in TEKS 7.B (protein synthesis), where the prior knowledge for this lesson is TEKS 5 (the student knows that structures at multiple levels perform specific functions), and 7.A (identify components of DNA and explain sequence for traits). Furthermore, the biology textbook provides evidence of building knowledge in the lesson with TEKS 13.B (ecosystem stability) by beginning the lesson with the basic needs of ecosystems and pairing that with predictive questions. The lesson then progresses to expository text and accompanying content, understanding questions with application questions (such as: “Think of your favorite sandwich”) and the ingredients that go into making the sandwich and the parts of the sandwich.

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

- The materials sequence instruction in a way that activates or builds prior knowledge before explicit teaching occurs that allows for increasingly deeper conceptual understanding. For example, in a lesson in 5B, students compare prokaryotic and eukaryotic cells. They begin by drawing on their prior knowledge of the definitions of prokaryotic and eukaryotic cells.
- Additionally, in a lesson on evolution, students answer the conceptual starter question, “What are the problems of using fossil evidence when looking at evolution?” From there, students read and annotate text and evolution to refine their thinking about this question.
- Furthermore, in Unit 2A, the unit begins with a student-focusing exercise to root student learning and understanding in the unit's vocabulary. The curriculum increasingly deepens in rigor to increase conceptual understanding by having students explore an expository text with guiding questions, research history in the content, then having students construct an accurate pyramid by choosing a provided number in the teacher instructional slides, and culminating in an extension activity that challenges students to “consider the wider effects of removing one population from a food web.”
- In Unit 13C, materials are intentionally sequenced to scaffold learning, beginning in the unit with a phenomenon, progressing to vocabulary exposure, reading and extrapolating information from an expository text, introduction of the nitrogen cycle and eutrophication linked with a practical student observational task to be completed over several weeks, and an evaluative exercise in explaining the processes leading to algal blooms.
- 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 inverse square law and determine if there is a direct relationship between light intensity and the photosynthesis rate in Biology 1H.
- The TPS materials have sequenced the learning to provide deeper understanding by increasing the rigor of the students' tasks with each lesson. In the student textbook for TEKS 13.B (Cycling Energy), student tasks begin with prior knowledge about why the animals are fighting because the previous learning is about competition. The lesson on how to read and construct food chains

then moves to creating and predicting how stability could be affected by removing organisms such as sea ducks or bivalves. Moreover, the biology textbook provides evidence of building knowledge in the lessons for TEKS 2.D (evaluating experimental and engineering designs) with tasks of accepting or rejecting hypotheses based on the provided information. The lesson then moves into designing an investigation to investigate a possible link between the rate at which ice melts and the addition of salt to the ice. At the end of the lesson, the students evaluate their design to solve the errors.

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 materials provide teachers with clear and concise lesson guidance that leads students to learn via science instruction. Within this guidance is clear information within each unit for how to facilitate student lesson activities, key questions to answer within each lesson task, and teacher guidance to address misconceptions, ensuring that concepts are presented. These components are included in each lesson. Each lesson has a core set of components that support teachers in facilitating effective lessons. For example, in a lesson on variation, teachers are provided with clear lesson guidance to facilitate students' learning activities. These learning activities begin with a basic knowledge review and scaffold up to students plotting height distribution. Students then combine their knowledge with this data collection to understand continuous and discontinuous variation and their relation to natural selection.
- The curriculum materials clearly and accurately present course-specific core concepts and science and engineering practices (SEPs). For example, in Units 2B and 2C, all core concepts and SEPs are presented in the teacher textbook resources with guidance on implementation activities and the link between the core concepts and SEPs and associated activities. For example, in Unit 7A, teachers are provided clear and concise guidance on lesson objectives and directions for facilitating activities aligned with the core concepts and SEPs. This alignment can be seen in the teacher's guidance for facilitating activities such as researching DNA structure and producing a DNA model from their research with embedded questions for teachers to ask students to help guide the student's research.
- The textbook is aligned to showcase the sections of the book by TEKS. The materials clearly showcase the core concepts covered since the state-defined TEKS arranges the text. For example, TEKS 2.D encourages students to evaluate experimental and engineering designs.
- Additionally, Biology 5.A (lipids) starts with the relevant TEKS 5.A, then moves on to the learning objectives, followed by the prior knowledge students should know. These pieces allow the teacher to teach the concepts and touch on what students already know so they can build upon their learning.
- This structure is also shown for Biology TEKS 5.D (describe similarities between the structure of cells and viruses and explain how viruses reproduce and act as a pathogen).
- The materials provide teachers with a clear road map of course-specific core concepts through the scope and sequence document. The scope and sequence document used in conjunction with the lessons from the materials leads to students learning via science instruction by the student tasks for TEKS 4.A (analyze explanations).

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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 include specific learning targets for each unit. The materials provide unit objectives for each unit and student learning objectives for each lesson. For example, each lesson begins with a student-friendly learning objective. In a lesson on variation in concept 10A, for example, students describe the genetic and environmental causes of variation in a population and explain how the evolution of a species through natural selection causes variation in a population.
- Additionally, in Unit 13D, three specific learning objectives are provided in student-friendly language sequenced to the prior knowledge of the previous Unit 13C. The learning objectives state, “Students will be able to: describe how changes to the environment affect the biodiversity of ecosystems. (2)...describe the human impact on the environment. (3)...explain how changes in biodiversity affect an ecosystem.” The lesson objectives are rooted in the language of the unit's TEKS, which states, “Explain how environmental change, including change due to human activity, affects biodiversity and analyze how changes in biodiversity impact ecosystem stability.” Moreover, in the lesson addressing TEKS 7B (gene expression), the objectives are to explain how the order of DNA bases determines the order of the amino acids. The other objective of this TEKS is to describe the process of transcription and translation in protein synthesis.
- The materials include the prior knowledge students must know before the current lesson. In the section addressing TEKS 2.D, the materials set goals for the current lesson to master the evaluation of experimental and engineering designs. Then, the 2A, 2B, and 2C concepts are shared for what students need to know to be successful. These foundations ensure all concepts are taught in order and build on each other to ensure greater complexity of understanding.

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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 provide some support for 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. 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 the "Teacher Textbook" and the "Student Textbook" that contains a list of the Texas Essential Knowledge and Skills previously taught within the course and grade level, though do not provide vertical alignment for the lesson. For example, in Unit 13D, the teacher textbook provides prior knowledge of TEKS; 13C, such as linking nutrient cycling and its effects on the stability of an ecosystem to how changes in the environment affect the biodiversity of ecosystems and the planet as a whole, providing examples as well in pollution, deforestation, and the overuse of natural resources, but lacks vertical alignment and guidance from previous courses of study in middle school. This lack can also be seen in Unit 13A with the linking back to the content covered in Unit 10 (Science Concepts-Biological Evolution): "The student knows evolutionary theory is a scientific explanation for the unity and diversity of life that has multiple mechanisms," as well as guidance for the teacher in linking it to ecological relationships and how they can affect the stability of an ecosystem. A final example is for TEKS 6.C (cell cycle disruptions); in the teacher textbook, the prior knowledge needed is B.6B (explain the process of cell specialization). However, no prior year knowledge is addressed in this section.
- Although the course materials include a vertical alignment K-12 chart listing all TEKS covered from kindergarten to physics within an Excel document, the chart does not guide teachers in

understanding course-appropriate prior knowledge and skills guiding the development of course-level content. Although the list of TEKS by grade level is provided, it does not support the teacher in developing a cohesive understanding of how specific concepts are aligned across grade levels.

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.

- The materials include background information for teachers that explains science concepts. For example, in a lesson on meiosis, students are expected to describe the process of meiosis and the importance of each stage. Teachers are provided with background information that connects lesson learning to prior lessons, explains the two types of reproduction, and explains each stage of meiosis.
- The curriculum materials contain explanations and examples of science concepts, including grade-level misconceptions, to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS. Each lesson has a section called Misconceptions that addresses possible student misconceptions. For example, in a lesson on meiosis, this section describes possible misconceptions students may have about the process and results of meiosis compared to mitosis. This section can also be seen in Unit 13D, with common student misconceptions included in the teacher's textbook with directions on how to address the misconception. For example, “Students may believe that their actions cannot affect the planet's biodiversity but should understand that all actions will have an accumulative effect on the planet as a whole.” The teacher can weave the misconceptions where they see fit in the learning process.
- The curriculum materials contain explanations and examples of science concepts, including grade-level misconceptions, to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS. Each unit has a teacher background section in the teacher textbook that provides insight into the content and helps to scaffold content knowledge for the teacher, including examples of science concepts. For example, in Unit 13D, there is a teacher background section that links and bridges previous unit content knowledge to the current unit of study, such as linking nutrient cycling and its effects on the stability of an ecosystem to how changes in the environment affect the biodiversity of ecosystems and the planet as a whole, providing examples as well in pollution, deforestation, and the overuse of natural resources. In another example, for TEKS 6.A (cell cycle), there are diagrams of the cell cycle along with descriptions of the stages of the cell cycle and mitosis.

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

- Materials explain the intent and purpose of the instructional design of the program. The program guide includes a description of the instructional materials with images and descriptions of the sections within the textbook to demonstrate how the program is designed. For example, it discusses the importance of using research-based strategies to ensure students are active learners in their education. The program guide also details the program components of each lesson and the TEKS that are related to the biology course.
- In the Online Library, directions are given to teachers on the intent and purpose of the program and directions for the use of the individual components of the program. Additionally, the instructional material support includes a toll-free helpline support contract.

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- The materials in the online resources provide a “How to Use the Program” document that lays out the different resources available to the teacher and how to deliver each program component. This document briefly describes the assessment generator, textbook, and other tools.

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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 consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers. Materials provide multiple 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 identify specific sensemaking behaviors of students. For example, in the program guide, teachers are told that storytelling is essential to students' ability to explain complex phenomena; storytelling is defined as one way the materials support sensemaking. Another example is found in Lesson 1A (Asking Questions Based on Observations and Information); students learn about the importance of asking questions when acting as scientists and engineers. Students read about multiple examples prior to applying this skill to a lab investigation.
- Expository texts for students are embedded in each TEKS chapter of the curriculum, in addition to guiding questions based on observed phenomena. For example, in TEKS 13A, students read an expository text about ecological relationships with embedded questions such as "Give an example of intra and inter-specific competition," followed by an exploration into the scientific research on evolutionary theory and natural selection, followed by a variety of activities to

assess student mastery of TEKS 13A concepts, including "Students should produce a 1-page revision document or mind map to show the key features and scientific principles involved in ecological relationships including predation, parasitism, commensalism, mutualism, and competition." For instance, in the activity for TEKS 1A, students work with an expository test by asking questions and defining problems based on observable phenomena. Embedded in the expository texts are questions for students to consider while reading the text. Another example is in Lessons 1E and 1F: Data. The expository text gives information about units and collecting data. The materials provide opportunities to act like scientists through the enrichment activity of having the students act as forensic scientists and make observations based on data. A final example is in Biology 2B and 2C, where an expository text is included for students to read about Jenny growing plants in her greenhouse. She designs and conducts an experiment to see if the plant food will produce larger tomatoes. The teacher is provided with key questions to elicit discussion on the topic and student tasks that require them to act as scientists to figure out the standard deviation and dig deeper into the experimental data. They are required to discuss the data, perform the experiment, write about their findings, and learn from their peers who share their findings.

- Materials provide support to Emerging Bilingual (EB) students via reading, writing, thinking, and acting as scientists and engineers. For example, the Biology 2B and 2C lessons include ELP activities to encourage teachers to provide time for group discussions so students can practice their listening and speaking skills while also reading and writing about the science lesson. The text specifically requests that teachers ensure students are speaking in English at the appropriate level while taking notes about what their peers share for their discussion.

Materials provide multiple 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 purposeful and targeted activities with appropriate expository scientific texts to gather evidence and develop an understanding of concepts. For example, in Lesson 5D, students read multiple expository texts about viruses and their replication to build their knowledge of how viruses transmit and spread disease. Also, in Lesson 1A (Asking Questions Based on Observations and Information), students read informational text on the importance of asking questions to make scientific discoveries. They then engage in a purposeful lab activity to practice using this skill. Finally, in TEKS 13D: Environment and Biodiversity, the expository text includes examples of polar bears in their environment and asks students to imagine how warmer temperatures could affect polar bears in the long term. The materials also include a chart with four species and how their tolerance for temperature ranges from species to species.
- The curriculum materials provide opportunities for students to engage in purposeful and targeted activities with real-world examples appropriate for the grade level/course. For example, in TEKS 10D, the expository text covers genetic drift and gene flow with imagery and practice questions to guide student thinking and engage students in meaningful learning. Also, in Biology 3B and 3C, the materials include an article on research history focusing on the COVID-19 vaccination development process. These examples help students understand the concept of vaccination in a modern setting with a detailed description of how vaccines work in the body. Finally, in Biology 2D, the materials include a look at research history and Thomas Edison. The text gives students a look into his life and his scientific discoveries. The text provides an example of a scientist that used engineering and scientific processes to create new products that changed the world. The text also emphasizes that Edison had to build, test, evaluate, and start

over again to ensure his inventions worked properly. This example shows him putting the processes into action to help students see how these processes improved life for everyone.

- The materials provide opportunities for students to engage with scientific texts, including activities, such as pre-reading and vocabulary, to help them develop an understanding of concepts. For example, in TEKS 13A, students and teachers are provided with lesson keywords and definitions and a "guidance document that gives students questions to consider while reading and asks them to annotate as they read." This structure can be seen in the Expository Text for Students and Lesson Key Words in TEKS 13A.
- The materials provide multiple opportunities for students to engage with scientific texts to gather evidence and develop an understanding of concepts by using practice questions to allow students to connect the text with evidence for answering questions. For example, in the lesson for TEKS 13D, Practice Question 2 asks, "Why aren't Bengal and Siberian Tigers found in the same environments?" Practice Question 3 asks students, "Why might the cooling of the Earth lead to the mass extinction of marine organisms as seen in an event from 445 million years ago?"

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 communicate thinking on scientific concepts by conducting investigations where evidence is documented in written and graphic modes. For example, in a lesson on 1E and 1F, students read and engage with multiple texts about how data can be shown (including graphs). They then conduct an investigation and collect data, draw a table, and graph the data they collected. An additional example is in a lesson on Standard 10A, where students learn about variation. They then gather data by collecting the heights of their classmates, graph the data, and then connect it to the concept of variation.
- Students record their ideas, questions, drawings, charts, and graphs in their student notebooks in order to discuss and revise their understandings at various stages of the lesson. For example, in TEKS 10D, Extension work, "students analyze available information and come up with their theories about the eruption of the Toba Super Volcano causing a genetic bottleneck in humans 75,000 years ago." This structure is also seen in TEKS 13B, where students "Construct and label a food web from the following food chains," using the provided organism food chains such as "grass, slug, thrush, Pet Cat." Additionally, in Biology 3A, students are given a visual image of how nitrogen cycles through the ground and atmosphere. The image is shown with arrows showing the flow and images dictating below and above-ground interactions with nitrogen. This graphic communication gives students a deeper understanding of how the process works, while the text also describes the process. Students also are provided a visual of what healthy cabbage looks like in an image with a supply of nitrogen versus what cabbage looks like when the earth is nitrogen deficient. These images give the students a clear picture of why nitrogen is so important in the soil.
- The material also provides opportunities for students to engage in various written communication through performance tasks. For example, the performance task for TEKS 12A (Body Systems) asks the students to explain and describe how other systems interact with the reproductive system.

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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 who can learn from engaging phenomena and engineering design processes and make sense of concepts. For example, in TEKS 1A: The Ruler Drop Experiment, students gather data on reaction time under the influence of caffeine in 100mL of cola and before consuming the 100mL of cola. They then use the collected data to determine if caffeine substantially affects the human body's reaction times. This experimentation is also seen in the online resource “Real Science- High School Student Edition.” In this activity, the students engage in experiments on the concentration of carbon dioxide and how it affects global temperature. After the experiments, the teacher pulls up global data, and the students make inferences and predictions.
- Students are asked to learn the difference between experimental and engineering designs, describe each step, and evaluate each process's strengths and limitations. Students are encouraged to work with a peer to learn how to implement the new terminology that might initially be difficult for them. Having a partner will help them overcome the productive struggle of utilizing the new academic language for these tasks.

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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 indicator. 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 to 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 provide opportunities for students to develop how to use evidence to support their hypotheses and claims. For example, in Lesson 1H, which is focused on the scientific method, students learn what characterizes strong evidence, then conduct an experiment and evaluate their process. In the lesson Biology 3A, students are asked to provide evidence of gravity using theories or models. Evidence is a requirement in classroom discussions. Students must describe gravity as a theory or law. The material also prompts the teacher to ask students for either data or models to support their description.
- The materials specifically prompt students to use evidence when supporting their hypotheses and claims in various activities within the materials, such as homework and extensions. For example, in a lesson on 7A, the homework task prompts students to gather evidence and produce a report comparing and justifying support for one of two opposing hypotheses. Also, in 6A Extension work, "Students should research how mistakes during mitosis lead to aging. Students should consider the role of telomeres, the 'tails' on the end of a DNA strand, in the aging process and why cosmetic companies have been researching the use of telomerase for

many years." This task asks students to research and use evidence to support their hypotheses and claims regarding how mistakes during mitosis lead to aging in humans.

- Furthermore, in TEKS 1E & 1F Collecting & Analyzing Quantitative & Qualitative Data, students write a paper after researching Darwin's data on Galapagos finch beak shape and size and communicate the conclusions of this data to support their claim. Also, in the TEKS 5D Homework, "Students should research the causes and effects of the 1918 Spanish flu pandemic. Where did it come from? How was it spread? How many waves was the pandemic spread over? What impacts were there on 'normal' life? How many people died as a result of it?" During the homework activity, students gather evidence via research and make claims and hypothesize about the causes, spread, and effects of the Spanish flu pandemic. Finally, in TEKS 7C (Mutations), the students research the causes and effects of a genetic disease and use their evidence to explain how the protein is affected.

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

- The materials provide opportunities for students to apply scientific vocabulary within context. For example, in a "TEKS 7C Variation and Mutations" lesson, students are provided with key vocabulary words. The teacher then models key concepts before students are released to answer questions using the vocabulary words. Another example is in TEKS 6B, Student Task 3, "The teacher should use the expository text and slides 19–33 to discuss specialized cells. Slides 20–26 can be printed out and dispersed around the classroom for students to decide, and note how the cells are specialized and how their structures relate to their function." In this activity, students interact with concept vocabulary acquired through reading and apply the scientific vocabulary in the context of specialized cells.
- Keyword vocabulary, with definitions, is presented at the beginning of each lesson, followed by opportunities for students to engage with concept vocabulary throughout the lesson. For example, the TEKS 6A "Enrichment Activity for ALL Students," has "Students create a presentation to inform audiences about: The Life Cycle of A Cell: The Cell Cycle, Interphase, G1 Phase, G2 Phase, Semi-conservative replication of DNA, Semi-conservative replication, Mitosis, Anaphase, Telophase, Cytokinesis." In it, students are provided a rubric in which they achieve "3 points for creativity and 2 points for accuracy of information for each of the content requirements." Also, in the lesson for TEKS 6A on mitosis, students engage in a learning activity to define key vocabulary words. They then use these terms in the next activity to create a flow diagram summarizing mitosis. Finally, the concept of genetic drift is introduced in context in Biology 10D. The students are introduced to the vocabulary in the text and can also review the glossary definition. Then, the text goes on to provide more examples and the characteristics of the term.
- The materials include embedded opportunities to develop and utilize scientific vocabulary by asking students to create questions about the content and vocabulary that are difficult to understand. Students then pair up and answer the question and discuss edits and details to the answers. There is an example of this in TEKS 5A Carbohydrates. The materials only provide the strategy; the students create the questions and answers to difficult concepts.
- The materials include embedded opportunities to develop and utilize scientific vocabulary through a classroom word wall and writing sentences using the lesson vocabulary. For example, in TEKS 5D: Virus and Cell Structure Comparison, the materials state that teachers should "continue to use the classroom word wall with students and ask them to write full sentences using the science lesson key words." There are no explicit examples.

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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 within stages of the learning cycle, supporting student development of content knowledge and skills. For example, in Lesson 6C, the lesson begins with a phenomena hook, followed by an expository text with questioning, with additional embedded homework opportunities where "Students should research the effects of exposure to ionized radiation on rates of mutation in DNA." This progression of activities shows the integration of argumentation and discourse that supports students' development of content knowledge and skills in an age-appropriate manner.
- Materials integrate argumentation and discourse throughout to support students' content knowledge and skills development by posing questions to prompt classroom discussion. For example, in Lessons 3B and 3C, students learn how to construct a scientific argument. After learning the components of strong arguments, students choose a position on a scientific topic and practice creating an argument. This integration is also seen in Lesson 10D, where the teacher uses a starter task to prompt a class discussion around natural selection and eye color. Students answer, "Is natural selection responsible for the distribution of eye color?" This task allows students to engage in discourse using different pieces of evidence. Similar opportunities for discourse occur throughout course materials. Another example can be found in the Online Slides for Unit 5D. Here, the slide asks, "Are viruses alive?" Students are then allowed to discuss and respond to the prompt. Also, in lessons TEKS 3B and 3C: Communicating Solutions and Engaging in Respectful Debate, students are asked to share a scientific argument with the class by asking students to complete tasks where they have to take on a role on either side of a scientific debate. The students then individually or collaboratively work to communicate their position by completing slide 10 to review the argument and the findings behind the development.

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 instruction for constructing and presenting a verbal and written argument to problems using evidence acquired from learning experiences. For example, in Lessons 3B and 3C, students are asked to craft a scientific argument using empirical evidence and explanations. This lesson teaches them the difference between explanations, arguments, and solutions.
- After learning the components of strong arguments, students choose a position on a scientific topic and practice creating an argument. Also, in Lesson 4A, teachers are provided with guidance to support English Language Learners in writing a report to critique the reliability of sources to support their claim. Additional scaffolds are provided to ensure all students can construct a written argument. Another example is in 7A Homework, where students "...produce a two-page document describing the advantages and disadvantages of each hypothesis, explaining with justification, which idea, or combination of ideas, they most favor. During this lesson, you will be completing several different kinds of writing. You may be asked to narrate, describe, or explain different things as you learn more."
- The materials provide opportunities for students to construct and present developmentally appropriate written explanations of phenomena through homework and other activities. For example, in TEKS 7C Mutations, the students are to research the causes and effects of a genetic disease and construct and present an argument explaining how the protein is affected. Also, in

Lesson 7A, “Enrichment Activity for ALL Students,” the activity has “...students create an act out the short play in which characters explain what DNA is and Identify components of DNA. The story must explain how the nucleotide sequence specifies some traits of an organism and examine scientific explanations for the origins of DNA.”

- Furthermore, in TEKS 1A, students ask questions based on observations and information. Students discuss whether caffeinated drinks are healthy or unhealthy, followed by the discussion question, “Can you give biological reasons for your argument?” Students then construct and present an argument based on the evidence collected during the discussion.

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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 how to scaffold and support students' development and use of 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 teachers with possible student responses to questions and tasks that support students during lessons and investigations. For example, in a lesson on 2B and 2C focused on scientific experimentation and reasoning, teachers are provided with possible responses to the starter question and sample questions from each point of view during later group work to support discussion. This structure can also be seen in TEKS 6C "Practice Questions," where students are asked questions such as "What is the difference between a malignant and a benign tumor?" The questions relate to an expository text discussing how disruptions to the cell cycle can result in diseases such as cancer. The materials provide teachers with possible responses to questions such as "Malignant tumors can cause tumors to develop in other parts of the body through cells fragmenting from the tumor, whereas benign tumors cannot. A benign tumor is surrounded by a membrane which prevents potentially cancerous cells from escaping and spreading around the body." Another example is in lesson TEKS 6B, where Student Task 3 includes possible answers to questions such as "red blood cells have no nucleus to carry more hemoglobin." Finally, in Biology 1B, possible student responses are provided for the teacher to utilize to plan the lesson and help with the direction of the discussion. The lesson also includes questions from the included PowerPoint and where the sample student answers are located. The questions are provided as well to ensure there is a rich discussion.

- The materials provide support for teachers to deepen student thinking through questioning. Each lesson contains key questions to ask during learning tasks to deepen student thinking. For example, in a lesson on 4A in which students go deeper into scientific reasoning, the teacher is guided to ask questions such as, “What are the strengths of his explanation? What are the weaknesses of his explanation?” to probe student thinking. For instance, in TEKS 6C of the Teacher Textbook, key questions are provided for each student task. For example, for Student Task 3, the key questions include “Can students explain the effect of mutation and methylation on these genes and relate them to tumor formation?”
- The materials provide teacher guidance on anticipating student responses and the use of questioning to deepen student thinking by providing a student misconceptions section for each lesson. For example, in Lesson TEKS 10C, the materials provide questions such as, “Why is polyploidy usually very harmful?” and “What are some things that can isolate reproduction in a species?” Materials also provide common misconceptions to support the teacher in deepening student thinking, including which organisms can breed with one another and how to address it with a discussion about reproductive isolation.

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

- The materials provide embedded support for the teacher in scaffolding students’ development of scientific vocabulary related to the concepts being taught. All lessons provide teachers with a lesson overview that previews vocabulary for the teacher that will be used in the lesson. Explicit connections under each vocabulary chart explain how each word will be used in context. For example, in Lesson 4B, there is scripting teachers can use to connect the vocabulary word “Socratic method” to writing during the lesson. Also, in Lesson 6B, Student Task 3, “The teacher should use the expository text and slides 19–33 to discuss specialized cells. Slides 20–26 can be printed out and dispersed around the classroom for students to decide and make notes on how the cells are specialized and how their structures relate to their function.” In this activity, students interact with concept vocabulary acquired through reading and apply the scientific vocabulary in the context of specialized cells. Finally, in Biology 4C, students are asked to retell a story they write to the class. The lesson encourages them to “try to use connecting words and appropriate vocabulary that they have learned.” The story is shared with the class. This activity allows the students to develop and use vocabulary in context. The teacher also provides scaffolding support by showcasing the resources available to the students for the lesson.
- The materials guide the teacher in supporting students’ use of scientific vocabulary in context throughout various lesson experiences. The materials provide experiences with new concepts, followed by opportunities to use the vocabulary presented. Lesson keyword vocabulary, with definitions, is presented at the beginning of each lesson, followed by opportunities for students to engage with concept vocabulary throughout the lesson. For example, in 6A, Enrichment Activity for ALL Students, “Students create a presentation to inform audiences about The Life Cycle of A Cell: The Cell Cycle, Interphase, G1 Phase, G2 Phase, Semi-conservative replication of DNA, Semi-conservative replication, Mitosis, Anaphase, Telophase, Cytokinesis.” In this activity, students are provided a rubric in which they achieve “3 points for creativity and 2 points for accuracy of information for each of the content requirements.” Also, in a lesson on DNA, students create diagrams showing the structure of a nucleotide and how nucleotides fit together to form a whole DNA molecule. Teachers are prompted with the key vocabulary they should see in the diagrams. Teachers are also provided with strategies to help English Language Learners retain scientific vocabulary in the lesson. Finally, Lesson 3A’s key vocabulary includes

scientific idea-explanation about how something works, scientific theory explanation verified through testing, and scientific principle-rule or mechanism by which scientific phenomena work.
- The materials guide the teacher on how to build emerging bilingual students' use of scientific vocabulary in context. For example, in Biology 5D, teachers recommend helping students build academic language through vocabulary. The section is for English Language Learners, but this teaching concept can be applied to help all students. Vocabulary usage is encouraged by the teacher in speaking and writing activities.

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

- The materials provide instruction on constructing and presenting a verbal and written argument to problems using evidence acquired from learning experiences. For example, in 7A Homework, students "produce a two-page document describing the advantages and disadvantages of each hypothesis, explaining with justification, which idea, or combination of ideas, they most favor. During this lesson, you will be completing several different kinds of writing. You may be asked to narrate, describe, or explain different things as you learn more." Also, in Biology 4A, students use a table to determine if a company's claims are scientifically accurate for an imaginary product. Students design an investigation into the product claims. They have to use the information provided and their investigative skills to complete the activity. Teachers provide support through questioning, and students share their findings from their investigation. This activity allows students to prepare a discourse and provide evidence both verbally in the teacher's questioning and in writing in their scientific report. Finally, in 7A Enrichment Activity for ALL Students, the activity has "students create and act out the short play in which characters explain what DNA is and Identify components of DNA. The story must explain how the nucleotide sequence specifies some traits of an organism and examine scientific explanations for the origins of DNA." Teachers can also access an online reasoning library with guidance to support students' critical thinking and investigation.
- The materials provide teacher questions for promoting student discourse and using evidence in constructing written and verbal claims through the "Key Questions for Student Tasks," where the materials give the teacher questions to help guide the students through tasks. Every lesson activity has scripted key questions. For example, in Lesson 7C (Changes to DNA), teachers are guided to ask questions such as, "What are the effects of changing many components?" to prompt discussion during student and teacher modeling.
- Additionally, In Lesson 4B, Task 2, the questions are, "Which of these discoveries have been the most influential? Why? Finally, in the lesson "Cells: The Foundation of Life," there are sample answers to the application questions, such as the question, "How do red blood cells perform a variety of functions?" The sample answer "Blood has many components" is provided.

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

- Each lesson has key questions to guide teachers in facilitating the sharing of students' thinking and finding solutions through student tasks built into the lessons. For example, in Lesson 2D, teachers are provided exemplar responses during the plenary (all-class conversation) to help teachers guide student discussions. For example, they are told that an exemplar answer is, "The rate of a reaction can be determined by timing the reaction until it reaches a predetermined endpoint."

- Additionally, in TEKS 1A, Task 6, the students must explain a scientific model. This activity is followed by teacher instructions to have students write questions and identify problems with the model. After the expository activity, students write additional questions and identify a model they would choose. Finally, the students research the advantages and disadvantages of their chosen models. Also, in Biology 4A, students collect empirical scientific data to test scientific explanations and solutions. Then they evaluate the evidence to assess the validity of the scientific claims. Questions are built into the lesson, like, “What are the strengths of this explanation? What method will you use? What results will verify the claims of the product?” These questions guide the discussion, help build students’ thinking, and guide them to the best solutions for the activity.
- The materials support and guide teachers in facilitating the sharing of students’ thinking and finding solutions by students grouping strategies to give and receive feedback. For example, in Lesson 4C, students are asked to give feedback on the strengths and weaknesses of museum websites in small groups.
- Materials provide examples of students’ written responses for sharing their thinking. This structure can be seen in examples of students’ verbal responses to starts; in TEKS 6C, “Cell division occurs throughout each stage of development, most rapidly in the fetus and early childhood. This continues through adolescence, after which it will only occur in adults to repair and replace cells. Hormones control each stage of development and transition from one to the next.” Also, in Student Task 2, the exemplar teacher guidance states, “Students may have personal experience of cancer through friends and relatives and will have encountered it through various media. The main misconceptions may be whether cancer can be caught or transmitted from person to person. Still, it is most likely that students will not realize that the formation of cancers is due to a process which occurs within everyone—when cells divide through mitosis in an uncontrolled way.”

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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 and indicate which student expectations are assessed.	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 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 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 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 range of diagnostic, formative, and summative assessments that include formal and informal opportunities to assess student learning in various formats. Materials include diagnostic assessments for providing teachers with information to monitor progress and identify learning gains in various formats; diagnostic, formative assessments include embedded questioning to accompany student expository text. For example, in TEKS 6A, teachers direct students to read the expository text about the cell cycle and mitosis and answer questions such as “Name 3 diploid cells in humans. In G2, more mitochondria are made. Why is this important?”
- The materials include an interactive software tool, the assessment generator, to create personalized formative assessments in each unit. For example, in the Online Library Biology-Assessment Generator, under Core Area 4-Biology, teachers can create a formal assessment tailored by TEKS (11 and 12), question type (multiple choice or open-ended), and question levels (below, at, or above level). TEKS 11 states: “Science concepts- biological structures, functions, and processes. The student knows the significance of matter cycling, energy flow, and enzymes in living organisms.” TEKS 12 states: “Science concepts- biological structures, functions, and processes- The students know that multicellular systems interact to perform complex

functions." In addition, a teacher could select Core Idea 2 (Genetics), TEKS Cluster 7, 8, or both, and then select the type of questions, such as multiple choice or open-ended.

- The materials include formative assessment opportunities for teachers to collect information about what students are learning from the materials and use it to plan future lessons. Each lesson contains open-ended key questions to ask for each learning task and close questions embedded in lesson slides to gauge student understanding. For example, in Biology 9B, there are Key Questions for each student task in the Teacher Edition of the textbook. These formative assessments give teachers informal data to determine how well their students internalize their learning. For example, one question is, "What are the differences between gradualism and punctuated equilibrium?"
- The assessment tools are described in the Teacher Program Guide - High School. Progress monitoring assessments provide four summative benchmark tests based on TEKS taught in the materials. The fourth benchmark covers all TEKS for the course for a full summative assessment of all learning in a more formal assessment opportunity, which is found in the Assessment Generator, which provides these along with questions by TEKS by chapter.

Materials assess all student expectations and indicate which student expectations are assessed.

- The materials contain a cohesive scope and sequence that maps out and outlines what will be taught in a specific course or grade level. The materials also indicate which student expectations are assessed on each assessment through the online assessment generator, which provides assessment items for each topic aligned to the TEKs for below, at, and above proficiency. 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.
- As outlined in the TEKS, the materials assess all student expectations by the course and indicate which student expectations are assessed within the "Assessment Generator."For example, in Core Area 4 - Biology, question 237, "What is the overall balanced symbol equation for respiration?" aligns to TEKS B.11. Another example is under Core Area 3: Biological Evolution, question 161, "Many fossils show evidence of similar structures in the same orientation as those found in modern species. What is the name of these similar structures?" is aligned to TEKS B.9.
- 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 assessments that integrate scientific concepts and science and engineering practices.

- The materials include assessments requiring students to integrate scientific knowledge and science and engineering practices appropriate to the student expectations. For example, in a lesson on 6B (Cell Differentiation), students are asked to explain the main stages of cell differentiation and then explain how environmental factors (such as temperature) would impact the production of daughter cells. Also, in Lesson 6A on mitosis, students answer assessment questions about the phases of mitosis, including completing their own diagram to explain the scientific concept.

- Materials include extension activities that integrate scientific concepts and science and engineering practices. The materials include short open-ended activities that require students to integrate scientific knowledge and science and engineering practices appropriate to the student expectation being assessed. For example, in TEKS 6B, the Homework activity asks, "Students...find examples of the future possible uses of stem cells and produce a short piece of work describing this." This topic can also be seen in TEKS 6A, Enrichment Activity for ALL Students, where "Students create a presentation to inform audiences about The Life Cycle Of A Cell: The cell cycle, Interphase, G1 Phase, G2 Phase, Semi-conservative replication of DNA, Semi-conservative replication, Mitosis, Prophase, Anaphase, Telophase, Cytokinesis. The presentation might be a production where students act out their information, a short movie, a poem, a song, or a newspaper article." The curriculum includes a rubric for assessing students' mastery of concepts based on their presentation, where "3 points for creativity and 2 points for accuracy of information for each of the content requirements."
- The materials include real-world science and engineering tasks integrating scientific concepts and science and engineering practices. For example, in Biology 5A (Proteins), students are asked to complete an activity similar to a forensic scientist reviewing criminal DNA. The students are asked to diagram the DNA molecule with the appropriate nitrogen bases, sugars, and phosphate groups. Students are introduced to science and engineering practices that actual forensic scientists complete. Also, in Biology 2D, students create a bird feeder using science and engineering design practices. Students must create a design that prevents other animals from stealing the bird seed for small garden birds. These activities bring engineering design into the biology course.
- Materials include informal assessments that integrate scientific concepts and science and engineering practices. An example of this is the plenary for TEKS 5A, where students have to write questions about what they do not know. Also, the student tasks from the lesson for TEKS 6A have students use colored paper or plastic bricks to model DNA replication.

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 a new phenomenon. For example, in Lesson 1C (Lab Safety), students apply their learning by creating a risk assessment after engaging in an investigation. Similarly, in Lesson 1D, students engage in a lesson about lab equipment. After engaging in an investigation, students are assessed on their ability to reflect on how well the lab equipment they chose did or did not meet their needs in the lab. Another example is TEKS 6B Enrichment Activity for ALL Students, which states, "Ask students to act out being a science journalist. They are to create a report to summarize facts about the process of cell specialization through cell differentiation, including the role of environmental factors." Also, the TEKS 6C Extension activity states, "Students can research the effects, and uses, of gamma radiation in causing and treating tumors." Finally, in TEKS Lesson 8A, the students research how bees perform two types of reproduction and how this is beneficial for the bees; this application of acquired knowledge provides a way for students to apply knowledge to new phenomena.
- The materials in Biology 1C include activities that require students to apply knowledge and skills to real-world engineering problems. For example, the Muscle Karts activity applies science and engineering practices to a hands-on activity where students must apply their knowledge to create the best design. Teachers may use the activity to assess what students have learned and applied to complete the activity. Finally, in Biology 1C, students use forensic science concepts to complete an activity similar to what a forensic scientist would do in mapping DNA. This activity

can also be used for assessment purposes to determine what students can complete after they have built the foundational knowledge of DNA.

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 students' 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.	M

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some 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 do not support teachers' analysis of assessment data, though provide general guidance and direction to respond to individual students' 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 a variety of 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 provide information and resources that provide guidance for evaluating student responses for summative assessments. For example, in the summative assessment for 7A, teachers are given an assessment for 7A and are provided with an answer key. This assessment asks students, "Which of the following nitrogenous bases are not found in the structure of DNA?" The answer key explains that Adenine, Guanine, Thymine, and Uracil are all incorrect answers and explains their role in the structure of DNA.
- In the Assessment Generator, Core Area 4- Biology, short response questions include an answer key with an exemplar student response example for each question. For example, the assessment generator asks students, "This reaction is called an exothermic reaction. What does

exothermic mean?" Then provide an exemplar response example stating, "Exothermic means that energy is released from a reaction to the environment (often as thermal/heat energy)."

- The materials provide questions with TEKS associations and correct answers for multiple choice and sample responses with criteria for short-constructed responses. For example, in Lesson 6C, sample answers are given in red for the answer key to the practice questions. Additionally, in Assessment 5A, teachers are provided with an answer key. For example, one question on the assessment is, "What are Lipids?" The answer key states, "Lipids are long-chain carbohydrate monomer molecules, joined together to form fats and oils." This type of answer key is provided for all assessments.

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

- The materials do not provide guidance or direction to respond to student needs though they do have documents that display student data on processing standards.. The Assessment Matrix includes each of the 14 TEKS; 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 what information results. 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 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.
- There are some connections in lessons on how to generally respond to assessment data with general suggestions given on how to meet the needs of big student groups through the "How to Help RTI Students" section.For example, in Biology 5A, teachers have recommendations for RTI, EL, and Special Education students under the respective section titles. Guidance for RTI students includes, "Students may need to review earlier grade content, and teachers can assign one of the K-8 Intervention Focus Tutorials, which can be found in the Online Library-Intervention Focus Tutorial. Choose G8 TEKS 13A," then lists the previous grade-level standard description. Teachers can assign level 1 questions for TEKS 5A to students using the Online Library - Assessment Generator. However, the materials do not specifically provide guidance and direction based on the students' individual needs based on assessment criteria.

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

- Information is gathered from the assessment tools which help teachers when planning core science instruction. The materials provide questions with TEKS association and correct answers for multiple choice and sample responses with criteria for short-constructed responses. For example, the assessment generator asks students, "Respiration is an endothermic reaction which converts the energy stored in glucose molecules into energy stored within the phosphate bonds of ATP, which can be released in living things so that all of the processes of life can be carried out. Respiration occurs in and on the surface of specialized cell organelles called Mitochondria. What is the correct order of the four main stages of cellular respiration?" The

provided exemplar response states, “Glycolysis, The Link Reaction, The Krebs Cycle, Oxidative Phosphorylation.” This structure provides the teacher with information when providing feedback to students and may help them determine a plan for instruction, intervention, and extension.

- The Assessment Software Tool allows teachers to store test data for reuse later within the unit. The dashboard provides an overview of the TEKS assessed and a score for each TEKS that displays the overall percentage of questions answered correctly to support the teacher in developing plans for instruction, extension, and intervention. The tests can be created by TEKS based on the individual skill level of the students. The tool can also create an assessment matrix to outline where students are performing well and what areas they still have yet to master. The Assessment Software Tool also allows teachers to send assessments at above grade level or below grade level TEKS to scaffold their instruction and assess how well students performed. The teachers could use these to plan interventions and extensions based on student performance.
- Additionally, there is a “Support Matrix” Excel file that displays student expectations covered in the course in the far left column. In the right column, there are resource suggestions that guide teachers to the appropriate page for reteaching of the same materials the students already covered. For example, TEKS 5A directs the teacher to have the student go back to the Teacher Textbook, Biology, p[x].

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

The intervention focus tool provides the foundational knowledge a student needs to know for a specific standard; for example, in 6A, the student expository text is cut down to two paragraphs explaining the life cycle of a cell and the basic concept of the cell cycle. Additional examples of guidance and resources on different activities to respond to student data can be found throughout the Teacher Text within each lesson via the support for RTI and ELL student sections. These resources appear after each Lesson Plan for each TEKS throughout the text. For example, for TEKS 5D, the text states, “How to Help RTI Students: Allow additional time and assign a mentor to work through the lesson plan areas causing students concern. Then use Level 1 questions for TEKS 5D. Have students answer them verbally or in writing to suit your classroom. Review responses and discuss in detail on a one-to-one basis.” Examples like this occur throughout the text.Additionally, in Biology 10C, guidance for RTI students reads, “Students continue to work on natural selection. If students still have not demonstrated comprehension of what natural selection is, continue to use the K-8 Intervention Focus Tutorial, which can be found on the Online Library - Intervention Focus Tutorial. Choose G7 TEKS 13D”; then lists the standard description. Additionally, there is extension work to direct high-performing students under the “Extension Work” section. For example, the “Extension tasks on slides 28-29 enable the students to test their knowledge and application of knowledge in exam-style questions.”

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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.	M
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.	M

Meets | Score 2/2

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

Assessments contain items that are scientifically accurate, avoid bias, and are 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 guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned to learning goals.

Evidence includes but is not limited to:

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

- The materials contain an online assessment generator that enables teachers to create error-free assessment items by standards. For example, when the teacher generates questions on TEKS 8.11, questions are created about photosynthesis. In one question, students are asked to look at equations for photosynthesis and select the correctly balanced equation. The question and all answer choices are correct.
- Formative and summative assessments include assessment items that align with taught objectives and present course content and concepts, science and engineering practices, and recurring themes and concepts in a scientifically accurate way. This feature can be seen in the Core Area 4-Biology Assessment, which accurately describes and assesses students' knowledge of enzymes and their functions within living organisms using questions such as "The image shows the lock and key fit of an enzyme and its substrate. Which option correctly describes the effect of temperature on enzyme activity?" Also, in TEKS Lesson 5D, the possible answers in the student tasks include definitions of "capsid" as a protein sheath containing the genetic material, "envelope" as a fatty layer that can surround the capsid, and "genetic material" as DNA or RNA as genetic material which contains the code for the reproduction of the virus. All of these are accurate. Finally, in a performance task for 3A, students are asked to describe the similarities and differences between saturated and unsaturated fatty acids. Teachers are provided with exemplary answers, and the question is accurate.
- Assessments contain items for the grade level or course that avoid bias. Formative and summative assessments include items that present content and examples fairly and impartially with no impact on student performance based on such factors as a student's home language,

place of origin, gender, or race and ethnicity. For example, in TEKS 8A, Extension work, students "research the life cycles of bees to study an organism which employs both sexual and asexual reproduction. What are the results of the two types of reproduction in bees, and how does this benefit the bee population?" Also, the materials include an Online Library with Fact Sheets for diverse students. The professionals chosen include both genders, varied races, and varied nationalities. They include scientists, engineers, and mathematicians. For example, in Biology 11A, teachers are given PowerPoint presentations with teaching and task slides. The teachers have a list of questions asked in the presentation. They allow the teacher to work through scientifically accurate questions and answers and are written without bias and error-free.

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

- Assessment tools use clear pictures and graphics. For example, in the Online Assessment Generator, the Core Area 3 assessment items contain images of the evolution of a horse that depict fossil records of horses. The image is clear, colorful, of an appropriate size, and age-appropriate for use in assessments for Biology Reporting Category 3. Another example is the online assessment generator. When teachers generate questions on TEKS 8.11, one question shows a model of enzymes breaking down larger molecules into smaller molecules. The diagram is clear and accurate and supports students in answering correctly. Also, a graphic is provided about viral replication in a performance task provided in the teacher textbook for TEKS 5D. The graphic is clear and labeled with each step in the viral replication process in a concise, easy-to-read way. Finally, in the Assessment Generator for Core Idea 5, there is a question about biomass that uses a clear picture of a biomass pyramid with numbers that are easily read, and that contains images of animals that can be seen clearly. In a few instances, graphics and images could be clearer. For example, in Biology 1E and 1F, the periodic table is too small to read.
- Assessments contain pictures and graphics that are developmentally appropriate. The materials contain pictures and graphics of cells and cellular structures that are developmentally appropriate with enough detail to learn science content but without excessive detail that would alarm or overwhelm high school students. For example, in TEKS 12B, when studying the system interactions that function in reproduction, materials include images depicting the pistil and stamen of an angiosperm, showing how pollen is released from the stigma and travels now the pollen tube to the ovary to fertilize the ovules. These images are developmentally appropriate for high school learners.

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

- The materials include a distinct section in the Teacher's Program Guide that supports the teacher in understanding the types of informal assessment tools in the curriculum. Teachers are provided with an assessment matrix to show which assessments are utilized throughout the course. They provide a place to add results from any tests they design from the interactive software tool, assessment generator, or any informal assessment from the materials.
- The materials provide clear guidance for teachers to consistently and accurately administer assessment tools. The formal assessment tool is supported by teacher guidance within the Assessment Generator, which gives an overview of the assessment and directions on how to build an assessment. It includes information to support the teacher in understanding the benchmarks.
- The materials include detailed information that supports the teacher's understanding of formal assessment tools and their scoring procedures. An assessment guide or a distinct section in the

Teacher's Guide on assessment includes a review of the benchmark tests to be given, which include a pretest (Benchmark 1), a second benchmark covering what has been taught so far, two benchmarks (3 and 4) to cover the material by TEKS tested for STAAR, and then an end of term examination for all TEKS. Teachers are also provided with resources within the online library through the help video on using the assessment generator. The video is a step-by-step guide on how to use and create assessments. Finally, the Family Program Guide shares the process for benchmarks, the assessment generator, and the interactive software tool with parents. The parents are given information to prepare them to see the report cards from the data in online performance exams in the system.

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

- The materials offer accommodations 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.
- Materials include guidance to offer accommodations for assessment tools so that students of all abilities can demonstrate mastery of learning goals. For example, the "How to Use the Program" guide suggests that teachers use the assessment generator K-8 content for "reteaching purposes."
- The "Teacher Program Guide High School" also states that "linguistic accommodations (communicated, sequenced, and scaffold) commensurate with various levels of English Language Proficiency as defined by the ELPS by inserting information for teachers at relevant points, and then by creating test questions and answers aligned to the ELPS."

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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

Meets | 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 and introduce common misconceptions. The materials include guidance for scaffolding instruction and differentiating activities based on targeted areas in which students have not yet achieved mastery. For example, in Lesson 2D, teachers are provided with possible misconceptions, strategies to support emergent bilinguals (EB), and strategies to support students with individual education plans (IEPs). Finally, TEKS 11A provides advice on addressing common misconceptions associated with photosynthesis and cellular respiration, such as students thinking plants do not carry out cellular respiration. Additionally, scaffolds are provided to assist with RTI, EB, and Special Education (SPED) students, such as including a lesson keywords table, assigning a mentor, creating a new set of questions, and chunking the questions to increase engagement and limit academic fatigue.
- The materials provide additional lessons for targeted instruction that include differentiated instructional approaches. For example, materials include various student activities that can be assigned to reteach, review, and practice skills for students who need additional support to master course-level science concepts and skills. There is a provided online library with intervention focus tutorials. These resources contain mini-lessons to support teachers in responding to students who need additional support or instruction. This response can be seen in TEKS 11A with the suggestion of the “Use the Online Library-Learn By Doing Activity Reader Books (Grade 8), Chapter 1: Fire and Water. Have students read the story, or read the story to students if they cannot, and have them complete the activities.” This response can also be seen in Lesson 4B to assist EB students using Archway, a phonics program in the Online Library, and

acting out being a scientist to assist SPED students. Note that these sections do not go up to high school biology but go from K-8.

- Teachers can access an Intervention Focus Tutorial to help struggling students succeed in the new learning. The teacher is also encouraged in the Biology 3B and 3C textbook to refer back to the Grade 8 TEKS 3B and 3C to provide scaffolding support to students who did not master those concepts yet. In addition, in Biology 3B and 3C, the materials encourage teachers to assign a mentor to special education students who could help them define the assignment. Is a written report, verbal representation, or an art model best for showcasing their learning? This option ensures students have guidance for their learning approaches and do not stress out when they hear the demands placed on the class, thus, giving them time to recognize their own learning needs and find learning success.

Materials provide enrichment activities for all levels of learners.

- Materials provide enrichment activities for all levels of learners. For example, the teacher's textbook embeds suggestions for engaging in enrichment activities to encourage further exploration of science concepts. For instance, TEKS 11A has extension work and the Online Library- Intervention Focus Tutorials and review content from grade 8. In the extension work, students “fill in as a summary and planning tool for the products of photosynthesis.” Another example is in Lesson 1H, where teachers are provided with an extension activity for all learners to research the inverse square law as it applies to light intensity. Enrichment activities are also embedded as student tasks in the online Biology slides. For example, in TEKS 6B, Slides 2, 3, and 4 provide various levels of questioning, such as knowledge-based in slide two, “What is a prokaryotic cell?” and higher level questioning in slide three, such as “Why do living things grow?”
- The materials include suggested projects that appeal to students' interests and abilities. They are found in the STEAM Arts project guide and contain cross-content references to other subjects, such as the enrichment activity, “Bark Like a Seal,” where students compare characteristics of taxonomic groups using modeling clay to understand the structures of a seal's skull and how these characteristics support its taxonomic grouping.
- The materials provide enrichment activities that account for learner variability. For example, materials suggest small group or partner discussions. This format can be seen in the teacher “Enrichment Activity” resource on how to support special populations such as RTI, EB, Special Education, and extension efforts for TEKS 12A. For example, in “How to Help RTI Students,” teachers are guided to “Assign level 1 questions for TEKS 12A to students using the Online Library- Assessment Generator. Assign a mentor to critique responses. The mentor can create a new set of questions and answers and step the student through key facts and how best to respond to test questions.”
- Also, in Biology 3B and 3C, the students create a debate topic and prepare it alone or in a small group. They argue their position on the topic and produce cards to mark the foundation for their argument. The students then debate with their class. The debate extends student learning by requiring students to define the pros and cons of each side of the argument to be prepared to discuss the learning. The materials in the Biology 3B and 3C units also include an extension activity for the students. They create a presentation in the lesson, and the extension activity recommends they argue the opposite point and create a presentation from that vantage point. The exercise requires them to look at the pros and cons of each side and develop an even deeper understanding of the concepts. This extension is provided for all learners and not exclusively for advanced students.

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

- Materials provide scaffolds and guidance for just-in-time learning acceleration for all students throughout the Learning Activities and key questions for student tasks provided in the teacher's textbook. The lessons provide support and resources for students ready to accelerate their learning. For example, in Lesson 5A (Nucleic Acids), teachers are provided with both extension work (additional questions students can answer to solidify their learning) and differentiated activities (in which students pair up and create quiz questions to test their knowledge) to accelerate all students learning. In TEKS 12A Extension Work, “Students should use slide 29 and try to describe and explain the interactions between body systems that occur when catching a ball.” Furthermore, in Biology 4A, students are provided an extension activity to use the textbook descriptions of concepts as clues to create a crossword puzzle with key topics from the lesson. This activity helps them review what they have learned and requires them to understand each word deeply to create clues from their learning. Finally, in TEKS 3B and 3C, Task 1 asks students to “explain the difference between scientific argument and explanations. Where the key questions are: What is the difference between argument and explanation?”
- Materials provide scaffolds and guidance for just-in-time assessment development for all students. For example, there is an online assessment generator tool. This tool allows teachers to create questions for below, at, and above-ability students. The tool supports teachers in assessing students at, below, or above their current mastery level.
- The Biology materials provide scaffolds and guidance for just-in-time learning acceleration for all students in the Online Library. This resource provides tools to assist the teacher with support for the students. The Online Library has Help videos and the Family Caregiver guide. For example, in the Help videos, “Video Biology TEKS 13A” explains the practice questions for students and images about symbiotic relationships. The Family Caregiver guide suggests family visits like a Texas wildlife reserve or a Texas State park. It also provides suggestions for family conversations, such as how to care for our health and conserve natural resources.
- The lessons include recommendations for just-in-time scaffolds to develop productive perseverance in learning. For example, TEKS 12A has an “Enrichment Activity for ALL Students” in which students review the Online Library-Learn by Doing Reader Books from Grade 7, Chapter 9, “What Dog Breed is Socks?” content and create a report to explain: (1) Does it introduce the content it set out to explain to middle school students? (2) How does the content provide a base level for students to build on in High School for learning content in this TEKS?
- In addition, the materials provide support in varied assessment modalities. In Biology 3B and 3C, the materials encourage teachers to assign a mentor to special education students who could help them define what the assignment will look like for them. Is a written report, verbal representation, or an art model best for showcasing their learning? This option ensures students have guidance for their learning and do not stress out when they hear the demands placed on the class, thus, giving them time to address their learning needs and find learning success.

TPS Publishing STEAM into Biology

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

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include a variety of 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 consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one). Materials consistently support multiple 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 material engages students in mastery of the content through various instructional approaches. For example, in a lesson on 5B focused on explaining the processes of cell theory and describing the basic structures of cells, students activate their prior knowledge independently and as a group, summarize independently after a teacher model, and create a visual representation of cells. Also, in Lesson 2A, the students answer questions about water's polarity, create a graphic organizer to evaluate the model, and create a model. In Biology 4A, the students create a crossword puzzle with the scientific concepts from the lesson. This unique activity for science helps students engage in learning and create a game from their knowledge. This lesson design helps the teacher engage the student in their learning. Finally, in Biology 4B, students are asked to consider what would happen to our current level of knowledge in the field of astrobiology if we discovered a highly-intelligent extraterrestrial life was proven to be in existence. The students are asked to write about how this would impact society while looking through the lens of government, religion, commerce, defense, and personal beliefs. This activity is developmentally appropriate and intriguing to many students.

- Lessons also include classroom demonstrations. In a lesson on 11B focused on enzymes, the class engages in a practical investigation of the effect of increased temperature on the amylase enzyme.
- The materials include a variety of developmentally appropriate instructional approaches to assess students in the mastery of the content through student textbook practice questions, practical assignments, and homework assignments. For example, in TEKS 5C, students answer practice questions about the cell membrane function and structure and a practical about osmosis. Afterward, the students discuss areas of the lesson where they need more help.
- The materials include clear guidance to support teacher understanding of developmentally appropriate instructional strategies aligned with the course's rigor level. This guidance can be seen in TEKS 1A with the “How to Help RTI Students” resource. It suggests, “Instructions for each practical activity should be copied and, if necessary, put into student-level language and glued into books before the investigation starts so that they can be followed like a checklist.”
- Furthermore, lessons include authentic tasks in which students use tools to measure and collect data. This practice can be seen in TEKS 1A, where students “...collect data from an investigation into the effect of caffeine on reaction times.” In the experiment, “each student or group of students may require a wide range of equipment to be made available by the teacher, depending on what they chose to investigate.”

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

- The material consistently supports flexible grouping (e.g., whole group, small group, partners, one-on-one) through differentiated activities. For example, lessons on core content and concepts are provided to the whole group. Suggestions are provided for small group or one-on-one practice and activities. 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. Also, in Biology 1C, students are provided an extension activity and are asked to work in small groups. Each group critiques the others and votes on a classroom winner. Then, students are encouraged to create a risk assessment alone for the same concepts. Finally, in Biology 1G, students create a model on their own. Then, they split into groups of three or four to review their model and explain it to the group. Students then explain the strengths and limitations of each model they saw in their group independently. The lesson allows for multiple individual and group activities.
- The materials provide guidance to teachers on how to use specific grouping structures to help in the assessment of content mastery. For example, TEKS 8A states that “to help RTI students be successful, students should be paired together to have them design new questions and answers to insert into the interactive software tool after individually completing level 1 and 2 questions for TEKS 8A.” Another example is in TEKS 9A, where, in order to help with RTI students, the resource recommends using Level 1 questions in the Online Library-Interactive software tool. In the lesson for TEKS 11B, the students are assigned practice questions to be done independently, but the practice is a whole group activity, and students are prompted to seek out peers to obtain assistance for difficult or hard concepts.
- The materials provide guidance to teachers on when to use specific grouping structures based on the needs of students. For example, in the program guide, the materials instruct teachers on the types of flexible groupings that will occur throughout the course. They also explain how to differentiate activities for students who are below, on, or above grade level. Also, the teacher resources for each TEKS provide guidance for working with RTI students, Special Education

students, and emergent bilingual (EB) students. An example is found in TEKS Lesson 2A, where the extension assignment states students should create their own; however, the section addressing EB students says assessments can be projected, which indicates it does not have to be done individually.

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

- The material provides multiple types of practices (e.g., modeled, guided, collaborative independent) to demonstrate relative mastery. For example, in a lesson on 2A focused on explaining each type of model and evaluating their strengths and weaknesses, students engage in modeled, guided, and independent practice throughout the lesson.
- The material provides teacher guidance and structures for effectively implementing multiple types of practices. For example, each lesson states a clear purpose and learning goals for the group and independent practice activities. In Lessons 2B and 2C focusing on data analysis, teachers are provided with learning objectives for the lesson overall. For each learning activity within the lesson, teachers are provided with both directions and task outcomes and key questions to ask to facilitate student learning.
- The material provides multiple types of practices (e.g., modeled, guided, collaborative independent) to help guide progressively differentiated activities. Each TEKS starts with a flash card vocabulary activity, followed by an expository text with questions for students to answer, a research history article that covers a science known for its contributions to the unit of study, and then differentiated activity options based on student needs. For example, in TEKS 8B, the expository text covers mendelian and non-mendelian inheritance with embedded practice problems, followed by an article about Gregor Mendel's contributions to the field of genetics, then options for activities to solidify concepts covered in TEKS 8A with scaffolding for struggling learners and enrichment extension activities for other students such as “...create models to add to their review card content.” and “...research other forms of non-mendelian inheritance such as epistasis and epistatic gene interactions.” A final example is TEKS Lesson 12A contains practice questions regarding body systems being linked and homeostasis lab tasks, such as in Slide 11, where students conduct a lab and make observations about skin cells in various water temperatures. They conclude with writing opportunities such as journaling about how diabetes disrupts feedback mechanisms.
- The material provides teacher guidance and structures for effective student grouping during the multiple types of practices. For example, in Biology 5B, students can work in groups during the class practical activity. There are multiple types of practices like this in each lesson.

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

- The material represents a diversity of communities in the images and information about people and places using images and information that are respectful and inclusive. For example, during one lesson in which students learn about the range of methods used by important historical scientists, students study the findings of scientists, including Albert Einstein, George Washington Carver, Mae Carol Jemison, Ada Lovelace, and others. Also, in Biology 1A, the text describes how Kaldi of the Oromo tribe first reported staying awake all night due to the coffee bean. Further, the Chinese emperor Shennong told of the restorative effects of caffeine. Finally, in Biology 4B, students are introduced to Albert Einstein and George Washington Carver. This section showcases white and black scientific researchers and describes their scientific contributions.

There is also a drawing of students in a laboratory. There are four white students and four students of color in the drawing.

- Images in the material reflect the diversity of school communities and match the content. All information in teacher guidance documents, student materials, scientific texts, and assessments positively portrays a diverse group of scientists and engineers representing genders, races, ethnicities, abilities, religions, and national origins. Characteristics vary in images to include race and ethnicity, skin tone, gender identity and expression, age, disability status, body size and shape, and hair texture. For example, in a lesson on body systems, images shown reflect diversity across multiple lines of identity. This diversity can also be seen in a TEKS 10A expository text, where two women of diverse backgrounds and scientists of European descent are represented.
- The Research History resource in the material provides depth and clarity about scientists of many different ethnicities, races, and creeds. Scientists such as Jane Goodall, Al-Jahiz, Vito Volterra, and Charles Darwin are all mentioned in this resource.

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

Meets | Score 2/2

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

Materials include 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.

- 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. This program can support language development with students who are English Language Learners. For example, in Lesson 2D, which is focused on the engineering design process, teachers are provided with resources in the online library to reinforce EB students' understanding of the engineering design process and include guidance on instructional strategies to develop language. Another example is in the Lesson 10A resource "How to Help ELL/ESL Students," where teachers are guided to "Ask students to use the words in sentences and resolve any misconceptions." While these activities as a whole meet the needs of students at all levels of proficiency, they are not labeled by proficiency level, which can make it difficult for teachers to provide appropriate guidance to students at different proficiency levels.
- The materials include suggestions for linguistic accommodations at critical points in the main lesson, such as sample questions and discussion starters, for students at the beginning and intermediate levels of language proficiency. For example, in 8A, teachers are directed to "Indicate to students different examples of environmental print. These may include posters or leaflets around the classroom. Ask students to tell you what each is about. Students should be able to derive meaning from these examples." Another example is in Lesson 1C, where teachers are encouraged to remind English language learners to connect the English meaning of a word

to their own first language. They ask teachers to encourage students to read aloud and describe what they see in the images in the text to develop a deeper meaning to the context.

- The materials include guidance for linguistic accommodations by providing specific ELPs-targeted activities for each lesson. For example, in Lesson 5B, "Prokaryote vs. Eukaryote," the ELPS activity is to "read aloud if able; if not, have the students describe the pictures in the book." Also, the section in Lesson 5A, Carbohydrates, includes strategies such as having students create questions about the content in their first language, then having the students swap with another student in the same language. After students have graded and made edits to the questions, students then work together to translate the questions into English.

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

- The materials encourage strategic use of students' first language through direct peer and academic mentorship. For example, in a lesson on 4A, teachers are encouraged to use mentors for English language learners who can strategically translate material into the ELLs' home language to help students build connections. Also, in Lesson 8A, English Language Proficiency Standards-ELPS Activity, the guidance reads, "As students are reading or being read to, speak with them about their reading abilities. Consider if their abilities are growing or if they need further support. If possible, ask specific questions about their knowledge of vocabulary and language structures, providing examples from the text they are using."
- The materials encourage strategic use of students' first language using online resources. 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.
- The materials encourage strategic use of students' first language by having students complete activities in their first language. For example, in Lesson 13A, Ecological Relationships, students create review cards for difficult words in their first language, then work with a small group to translate them into English. Similarly, the teacher is asked in Biology 5A to print vocabulary cards for students to practice in class and at home. Another example is in TEKS 10A, How to Help ELL & ESL Students, where the material instructs the teacher to "have students use their first language and list out the keywords alongside the English version." Finally, in an example from Lesson 6A, Cell Cycle, the students create Level 1 questions in their first language, then work with a partner to give detailed answers orally and in writing in English.

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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 design of the program. 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 High School Family Program Guide supports caregivers with an overview of the philosophy of teaching and learning, research-based strategies, and how families can support the students in the course. The guide is provided for all high school science courses and then broken down by subject area. This guide is in PDF form, which can be copied/pasted into online translating tools. An overview of the online resources is available for students and caregivers to use at home. The navigation guide details the online product and how to move through the resources in the program.
- The Family/Caregiver High School Guide includes the “Philosophy of Science - Teaching and Learning,” a Program Introduction, and research-based strategies employed within the curriculum. The guide states, “In a science classroom, students emulate the work of scientists and learn science through a rich series of lessons that require active engagement in the entire process. The pedagogies used in the science classroom must focus on improving student learning and full engagement using the cognitive, affective, and social domains.” Other examples shown include paragraphs about how learning increases by having students move, according to research done by Wesson in 2009.
- The Family/Caregiver High School resource also includes the “Learn by Doing” guide explaining the reasoning and logic behind lab investigations and direct instruction.

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

- Materials provide resources and strategies for caregivers to help reinforce student learning and development. For example, the High School Family Program Guide contains glossaries that can be used at home. In the Family Support Section of the High School Family Program Guide, families are encouraged to determine how scientific terms and definitions are useful in their everyday lives. It also includes guidance that families/caregivers have access to all teacher resource videos, such as the NEST Family videos and workbooks for the animated Heroes Classics, to support them in gaining content knowledge to support their students. For example, one of the videos includes scientists such as Marie Curie and Louis Pasteur with workbook activities designed for older students, such as crossword puzzles. Also included is a section for the parents of the TEKS for Biology. This section provides the parents with an overview of the exact learning required by the state.
- Materials provide information for students to build interactions with caregivers to help reinforce student learning and development. This idea can be seen in TEKS 5A Student Focus Exercise, where students are given the following directions: “You are to take a text home from school with you. At home, describe and explain the text to your parent/guardian. Think about what information you have learned from the text and make sure you would be able to describe and explain it to the rest of your class.”
- Materials include “At Home” activity sections. The content is intended to be completed by students in conjunction with their parents/caregivers, per the Family/Caregiver Program Guide. This format can be seen in the Student Textbook in the TEKS 3A Homework: “Students should research resigning a bird feeder which will only provide food for small garden birds, preventing the food from being stolen by other animals. They should detail how the design process would lead to its development.”
- The materials provide information to be shared with caregivers for how they can help reinforce student learning and development outside the home by providing suggested locations for families to visit, such as Texas State Parks or Texas Wildlife Reserves.

Materials include information to guide teacher communications with caregivers.

- Materials include teacher guidance resources for communicating with caregivers. For example, the Program Guide includes information on engaging caregivers as partners in learning and offers suggestions for establishing a relationship, inviting ongoing communication and partnership, and sharing progress updates. It describes suggestions for ways family members can assist students in content mastery, such as “[The program] ask(s) family members to review all new terms and definitions with students at home and identify how they are useful in their daily lives.” Additionally, it shares the free online materials caregivers have access to. An example is “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."
- Materials include programs for providing educational resources for whole families. For example, teachers are provided guidance to use Archway (a free phonics program to support the whole family in learning English) if they have students who are new to the country and who may not speak any English.

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- The High School Family Program Guide provides a guide for teachers to share with parents on the format of the materials. This guide is provided in a digital format, but schools can request printed copies to send to caregivers. A section outlining the role of the family in the reinforcement of the TEKS at home is also included in the guide. This section can assist in studying and showing how they apply to home life.
- The High School Family Program Guide showcases the textbook adoption rubric and process so parents understand how rigorous the process is to approve textbooks. It explains the adoption process and provides the rubric.

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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 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 clear 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 scope and sequence of materials can be accessed through multiple platforms: online via the teacher resource library and within the Teacher Textbook-Biology. The course materials include a comprehensive TEKS-aligned scope and sequence, outlining the sequential order in which knowledge and skills are taught and built throughout the curriculum. The scope and sequence contain detailed lists and explanations of each standard and hyperlinks to when and how they are covered in the textbook. For example, Unit 1: Biomolecules covers TEKS 5A, 7A, and 11A, where teachers find a brief description of each standard.
- A year-long calendar view shows each month's sequenced units and lessons, including the number of class periods for each unit, the focus of knowledge for the unit, and the covered TEKS.

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

- The curriculum provides teachers with a detailed section about students' prior knowledge in every lesson, facilitating connections with previously taught content and science and engineering practices as seen in lessons like Lesson 2B: Data Analysis and Lesson 13A: Ecological Relationships, where explicit connections to prior knowledge about quantitative data analysis and interactions between plant systems, respectively.
- There is robust teacher guidance in the curriculum for facilitating student-made connections across core scientific concepts and engineering practices and enabling extensions of learning, for

example, in Unit Biology 6C and 1C, where students relate the concepts of cancer, cell cycle, and mitosis via expository writing or connections to science and engineering practice (SEPs), such as calculating margins of error for experimental investigations.

- Curriculum units provide practice questions and real-world scenarios that assist teachers in encouraging students to make connections and apply their learning to core concepts and science and engineering practices. For example, in a question in biotechnology, the student explains how the PCR technique is used at a crime scene where students think like forensic scientists through PCR engineering skills. Additionally, the first lesson of the course, "Asking Questions Based on Observations and Information," has students use models to ask questions and define problems as it relates to the "temperature change in the last 50 years" graphic.

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

- Every lesson incorporates a section focused on prior knowledge, allowing students to connect their new learning to previously gained knowledge and concepts, reinforcing the spiral learning approach. For example, in Lesson 5B: Prokaryotic and Eukaryotic Cells, the content revisits the understanding that cells are the fundamental building blocks of all living organisms.
- Each unit features a student journal activity where learners answer daily questions based on prior knowledge, further contributing to the spiraled dissemination of knowledge and skills throughout the lessons. This spiral is evident in Unit 5A: Lipids, where students demonstrate prior knowledge about enzyme composition.
- The curriculum includes review and practice activities continuously spiraling throughout the year to support mastery and retention. These activities, including learning tasks, homework, and extension work opportunities, can be found at the beginning of each chapter in the *Teacher Textbook*, as shown in units like Unit 7A, where students observe an image of DNA and respond with what they learned so far about this biomolecule and Unit 7C where students recall and define keywords, concepts, and ideas from previous lessons about the structure of DNA.
- The teacher edition provides opportunities for students to apply their learned skills, such as microscope usage and its historical context. This practical approach aids in the retention and mastery of skills across the curriculum. The first time students learn about microscopes is at the beginning of the year when TEKS 1D is covered, followed again when covering TEKS 5B, defining the differences between prokaryotes and eukaryotes, and finally, during cell specialization.

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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.	M

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include 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 standards 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 guidance for safety practices, including 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 materials have a teacher program guide to support teachers in using the materials, with a list of the included materials and explanations of each program component.
- The materials are organized to facilitate ease of implementation and use, including assessing and storing materials. For example, the scope and sequence, pacing guide, and teacher resource introductions at the beginning of each unit help teachers support learning for all learners. It also explains how to navigate online resources and supports using assessments.
- The curriculum materials include teacher guidance and recommendations for using materials, including text, embedded technology, enrichment activities, research-based instructional strategies, and scaffolds in the sidebars for use with students who need further work on science concepts. For example, in Unit 1C, the unit overview provides teachers with a teacher background about the lesson and what it will cover, teacher preparation to ensure the lesson is successful, expository text activity, risk assessments, and recommendations for scaffolds to support and enhance student learning for emergent bilinguals (EB), RTI, and special education students as well as extension activities for students who need an additional academic extension

to the activity. A second example occurs in concept 7B, where teachers are provided with extension activities, support for addressing misconceptions and supporting specific student groups, and enrichment activities for all students. Teachers are guided to create a group extension project to allow students to explore a project of choice.

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

- Materials include a scope and sequence that includes a concept overview showing which key ideas are taught in each unit, including which TEKS are covered in each unit. For example, Unit 5: Cell Differentiation contains TEKS 6A, 6B, and 6C.
- Each lesson begins with the TEKS located at the top of the page with the description of the standard written out. For example, the topic of viruses correlates to TEKS B.5D, “compare the structure of viruses and explain how viruses spread and cause disease.”
- The teacher resources reference cross-content material and include a STEAM program guide with additional projects to complete that include arts connections. There is a correlation chart provided that contains art, creative writing, English 1, and mathematics standards. For example, there is a project called “All I Can See is Red.” This encompasses art standards (2ai) which is to use visual solutions to create original artwork by problem-solving through direct observation. There are multiple other examples in the STEAM Art Projects Guide - Biology of project ideas that are aligned to multiple, cross-content standards.
- TPS also provides an Online library - Scientists - with social science content by providing fact sheets for scientists, mathematicians, and engineers.
- TPS does show cross-content for science TEKS and has included other subject information in many components. For example, the Teacher Textbook has examples of ELPS sections in each lesson plan that align with the ELPS requirements. The High School Teacher Program then details the ELPS requirements. For example, English 1ai, “engage in meaningful discourse by listening actively,” is in the ELPS activity of the teacher edition. In the Teacher Textbook, one section is titled “How to help RTI Students - use of Algebra I and iMaST projects.” Rather than a cross-reference, the materials took the approach of providing full components, and within those components, details are labeled. Another example is the Online library -Enrichment Shark Project. This is a K-12 project. The Online Library - Learn By Doing K-8 materials contain essential cross-reference guides for each grade.

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

- In the online HS teacher support section, there is a section called “STEAM Science Kitting/Materials List - Biology.” It includes all materials needed to support instruction for the whole year.
- Slideshow presentations are also given, which detail the equipment required for practical and investigation work.
- Each lesson contains a comprehensive list of materials, including all equipment and supplies needed to support instructional activities and to complete the lesson. These lists include items specific to the lesson, such as indigestion tablets, graph paper, peas, and table salt. For example, in concept 1D (Scientific Tools & Equipment), a list of necessary equipment is provided. Another example is the biomolecules resource section, which includes safety glasses, test tubes, various foods, and a 40% sodium hydroxide solution.

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

- The materials contain a safety practices section detailing general safety procedures and guidelines for a science lab, such as identifying hazardous symbols, first aid procedures, and risk assessment tips.
- In this section, Lesson 1C, teachers are given guidance to facilitate a safety practices and procedures lesson. This unit provides instruction on the common lab equipment and grade-appropriate use of safety equipment. It provides scaffolds and guidance to teachers for safety practices while students read, discuss, and practice conducting risk assessments.
- Curriculum materials include student and teacher guidance for safety practices, including the grade-appropriate use of safety equipment during investigations. For example, Lesson 5A reminds the teacher to instruct students to wear their goggles during the hands-on laboratory experience. Another example is in the materials slideshow for Unit 12 TEKS 12B. Slides 12 and 15 require using a scalpel and forceps, and the students are reminded to be careful and take care when using the equipment.

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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.

The 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 materials are accompanied by a scope and sequence that includes unit information, suggested lesson length overview and timing, TEKS, and textbook references. For example, the scope and sequence explain that Unit 1 contains eight class periods of 50 minutes each.
- The materials provide teachers with a pacing calendar that shows how each core area fits into a calendar of the year. At the lesson plan level, teachers are provided with guidance on extension activities should they need to extend the lesson's time.
- The materials include guidance and recommendations on required time for lessons and activities with options for a variety of scheduling considerations. Additionally, in the *Teacher Textbook*, there are teacher guidance sheets at the beginning of the unit that include lessons by TEKS alignment, and each unit includes an extra lesson catch-up, review, or an additional mini-lesson. For example, Unit 1: Biomolecules suggests that teachers spend eight 50-minute class periods with a built-in extra lesson for a “catch-up” review and/or mini assessment over biomolecules.
- The curriculum materials clearly delineate the order of units to ensure students learn about precursor concepts first. The materials also provide guidance about the flexibility of the placement of specific units. Setting the lessons up by TEKS and the required knowledge necessary provides an opportunity for flexibility in the placement of units. For example, in Unit 5B, a teacher's background explains how the previous TEKS information has taught crucial skills necessary for the TEKS-based lesson in 5B.

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

- The materials clearly delineate the order of units to ensure students learn about precursor concepts first. The materials have students study cell structure and function, the processes of photosynthesis and respiration, and the basics of genetics, such as DNA structure and replication, before the role of nucleic acids and principles of inheritance and variation of traits.
- The curriculum materials provide guidance for strategic implementation that ensures the sequence of content is taught in an order consistent with the developmental progression of science. For example, materials provide a suggested sequence of units that considers the development of conceptual understanding and skills development from a microbiological level ending with macro biology concepts. For example, the units start with Unit 1: Biomolecules and then progress, ending the school year with ecology.

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

- The materials provide teachers with a pacing calendar that shows how each core area fits into a calendar of the year. The pacing calendar contains flexibility, with days held for revision and reteaching.
- For example, the curriculum has 123 50-minute lessons, with nine additional supplemental lessons. The materials provide some flexibility with nine supplemental lessons. The materials provide flexibility in adjusting to local time and scheduling constraints with nine supplemental lessons but do not account for alternative academic schedules such as block schedules. This schedule can be seen in the Scope and Sequence teacher documents.

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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.	Yes
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.	Yes

Not Scored

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

Materials 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 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.

- Students are provided with an interactive journal. The journals have clear focus questions, include sufficient white space for students to write, and are easy to understand.
- Student materials are appropriately designed with clearly marked spaces and differentiated content. Titles and headings are prominent and clear; sections are clearly marked with subheadings, and content is organized in a logical progression. For example, in Biology 1H, the sections are outlined with text boxes to separate one from the other. The section titles are bolded and organized very clearly. There is an appropriate amount of white space around the border to help define each page, and it does not distract from student learning. Each section on the page is boxed off for a layout that is neat and clean in appearance. Also, in Biology 2D, ample white space allows the design to support and not distract from the student learning. There are charts and tables to organize information built into sections. Each section has a text box around it to separate it from the neighboring sections, which makes the visual outline more appealing. Student ancillary student materials, such as glossaries and tools, are also easy to find and/or access.
- Teacher guidance materials contained within the teacher textbook are appropriately designed with clear, designated places for important information. Teacher guidance materials include teacher's guides designed so that teachers can locate important information easily for planning and implementation, such as answer keys, directions for intervention, and ELPS and Special Education accommodations. Teacher materials use clearly labeled callout boxes and tabbed pages to easily identify important information.

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

- The materials embed age-appropriate charts and symbols that support student learning and engagement without being visually distracting. For example, in a lesson on engineering design, there is an easy-to-read flow chart on the steps of the engineering design process that supports students in seeing the flow between steps while still being easy to read.
- The materials include age-appropriate historical pictures and graphics that support student learning and engagement. For example, in lessons referencing historical scientists, there are appropriate thumbnail images to help students visualize the referenced scientist.
- Some pages can be visually distracting for students and may have pictures and graphics that could be referenced in a more age-appropriate fashion. For example, in Biology 2A, the pages are very heavily covered in writing, and there is only one image, about two inches wide and about 1/5 inches tall, of a man in his 60s holding a globe. Visuals can occasionally be of higher quality with age-appropriate models.
- The Biology materials contain age-appropriate laboratory-based graphics that support learning without being visually distracting. For example, TEKS Lesson 5D contains images of bacteriophages and retroviruses without excessive labels to not distract students visually.

Materials include digital components that are free of technical errors.

- The materials are free of spelling, grammar, and punctuation errors. For example, the student glossary is free of spelling errors. Materials are also free of wrong answer sheets to problems. This feature can be seen in the student's textbook.
- The materials include digital components that are free of technical errors. However, in the online textbook, the pages load very slowly. There are errors when you click on a page and zoom in. When you try to zoom into a page, sometimes the book turns the page. Also, when you try to turn the page, sometimes the book zooms into the page as well. The online textbook can be difficult to read at the default size of 100% on the screen. If you want to look at a page, you have to zoom in, but you cannot stay zoomed in and flip through the pages. So, you have to click a page, zoom into it to see what it has, and then minimize the view, click to the next page, and wait for it to load. This feature can make using online text very cumbersome.

Materials are free of inaccurate content materials or information. For instance, the student materials for TEKS 8B displays a Punnett Square and how to complete it with the directions and arrows. A flow chart also displays the flow of alleles from F_0 generation to the F_1 generation.

TPS Publishing STEAM into Biology

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.	Yes
3	Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate.	Yes
4	Materials integrate digital technology that is compatible with a variety of learning management systems.	Yes

Not Scored

Materials are 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 integrate digital technology in ways that support student engagement with the science and engineering practices and course-specific content. Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate. Materials 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 guide teachers to use simulations, interactives, and related activities to support student learning. Teacher guidance includes suggestions for time and pacing and ways to assist students with making observations, asking questions, collecting data, and participating in discussions. For example, in Lesson 4C, teachers are provided with embedded guidance on using free online museums and libraries to support student learning.
- The embedded technology within the materials supports the print resources instead of replacing them. The Online Library of Biology help videos are always available to support intervention and instruction during delivery. It provides open-access research journals and peer review journals for students to search to develop a deeper understanding of research and scientific findings. For example, the “Help Video-Biology TEKS 13A” breaks down the TEKS and reviews examples of ecological relationships such as predation, parasitism, commensalism, mutualism, and competition, as specified in the TEKS. Also, intervention for struggling students can be found in the Online Library Biology – Intervention Focus Tutorial.
- The materials provide online assessment tools that help teachers create differentiated assessments that help students engage with content and identify areas of need. For example, in Biology 4A, teachers are recommended to create an assessment starting with Level 1 questions and then building up to Level 2 and then 3. The students then answer the questions and discuss any misconceptions. This content is a great addition that allows teachers to use these tools for student learning and engagement.

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

- The materials provide digital resources to aid in engagement for differentiated groups of students. For example, in Lesson 2D, teachers are provided with various online tools to support different groups of students with engineering practices. Teachers are prompted to use online learning by doing modules with special education students. There is an opportunity to deeply embed digital technology within the delivery of the main lesson as necessary.
- The materials provide opportunities for students to obtain, evaluate, and communicate information using digital tools. For example, in Lesson 3A, students are guided by their teacher through a research task. They are given research questions and use online tools to find the answer. The teacher is provided with slides to guide the activity. Also, in TEKS 4C, teachers are encouraged to pull an Enrichment activity from the Online Library-Enrichment resource. The Enrichment Projects for Biology include “Bacteria at Work,” where “Students explore the growth of bacteria and apply that knowledge as you use bacteria for a specific purpose.” Similarly, TEKS 7D Slide 4 links students to research genetic engineering. Finally, in Biology 4A, students research the move toward electric motor vehicles and go online to get reliable information about the topic to create an educated and informed decision. Students are encouraged to choose from reputable sources, but the connection to internet research helps build the engagement of this process.
- The materials provide interactive simulations and models for students to explore scientific and engineering practices in a virtual environment. For example, in Biology 2D, teachers build an electric motor vehicle through an engineering task. They must plan out a concept and utilize the internet for research. The teacher reviews design challenges, and the online materials allow students to review the same activity in lower grades to get more foundation for the process if they need more support to complete the project. This activity is designed for high student engagement through a hands-on foundation and material reviews about engineering for moving vehicles.

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

- The materials provide multimedia support for teachers to help support collaborative efforts for students. For example, in Lesson 3A, students and teachers collaborate to engage in research to answer research questions. Teachers are provided with slides to guide student collaboration on their research topics.
- The materials provide Online Libraries that allow students to collaborate in research-based activities. For example, in Lesson 2A, teachers are guided to engage in an enrichment activity for all students. They work together to read about glaciers in Alaska using the Online Library-Alaska. Students then create a model about glaciers and present the limitations and disadvantages of the model for what is being presented.
- The materials provide interactive Explore activities students can complete collaboratively in pairs or teams. For example, the Interactive Assessment Tool-Online Test and Quizzes allow teachers and students to assess their knowledge of content and collaborate with their peers. The teacher can share the correct answer with the student through the program or can ask and enter their information to direct the student to a deeper understanding of the content.

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

- The materials are accessible online through any device with internet access. For example, the materials are accessible and compatible with Chromebooks, iPads, desktop PCs, Apple computers, and/or smartphones.
- The online materials function on multiple internet browsers, such as Google Chrome and Microsoft Edge. For example, the tools and resources from the Online Library are functional in multiple browsers as long as students have internet access.

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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.	Yes
2	Materials provide teacher guidance for the use of embedded technology to support and enhance student learning.	Yes
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 developmentally and course-appropriate and provide support for learning.

Digital technology and online components are developmentally appropriate for the course and align with the scope and approach to science knowledge and skills progression. Materials provide teacher guidance for the use of embedded technology to support and enhance student learning. Materials are 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 materials provide information that identifies how online and digital components align with science knowledge and skills. For example, the online intervention focus tutorial provides access to different materials (including K-8 materials) aligned to the standards for reteaching. An online library of teacher support guides teachers on using all program components, including digital tools such as video libraries and “How to Use” guides. The library’s contents are detailed and written into the textbook for teacher ease of use and to enhance learning throughout the course. They also encourage teachers to connect with previous content as they read it.
- The materials provide information for related TEKS, SEPs, and ELPS for online and digital components within the Teacher’s Guide. This information can be seen at the beginning of each lesson. For example, TEKS 6C provides the standard, skills developed, resources, SMSC opportunities, and pacing and class information at the beginning of the unit.
- The materials include technology tools like a calculator, graphing calculator, scientific calculator, unit converter, and whiteboard to assist students in science instruction. The materials also include information about coding tools and data analysis platforms in the Teacher’s Guide.

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

- The materials provide specific teacher guidance for embedding the technology within lessons and assessments. For example, in Lesson 2C, the teacher's textbook guides teachers to the online libraries they should virtually visit to add to the lesson.
- The materials provide clear instructions and tutorials on using the embedded technology within the teacher platform. An online teacher support library guides using all digital components. The library's contents are listed to help the teacher review what is available and how they can use it in the appropriate lessons through the lesson notes in the book. The Teacher Program Guide includes step-by-step instructions for setting up and using the technology and troubleshooting tips for common problems that teachers may encounter.
- The materials provide teacher guidance for digital and online assessment tools within the assessment guide. The guidance includes tips for how teachers can monitor student progress and evaluate the effectiveness of the technology via the Online Assessment Generator. The materials also include resources in the Online Library to show teachers how to use the Assessment Generator Tool. The "How To Use The [program] Interactive Assessment Software" tool provides a video for using this tool to produce, store, and assign tests. Details are provided on how to create tests by TEKS or skill levels (DOK 1–3), or to create their own questions. They can save these tests and access them later for printing, storage, editing, and reusing.

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

- The "Learning by Doing" activity readers are available to parents/caregivers at home to support their child's science education.
- A Family/Caregiver Guide is available within the ancillary materials that provide parents with an understanding of the entire program, free online tools, and digital access to homework content. The guide includes information about the TEKS/ELPS and provides materials for families to focus on at home. It also guides how to navigate the online system and get progress monitoring reports sent to them, and suggestions for family activities such as visiting Texas parks, coastal wetlands, wildlife reserves, and Gulf Coast beaches to apply what they have learned in class to what they see in the natural world.