Discovery Education Science Techbook for Texas Biology

Discovery Education Science Techbook for Texas 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 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 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 to 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.

- The materials provide multiple opportunities to practice grade-level appropriate scientific and engineering practices outlined in the TEKS via STEM Project Starters, found in most units. For example, in Unit 2, students engage in a hands-on lab in which they model virus outbreaks. Students make predictions, based on their knowledge, about how viruses spread. They then model a viral outbreak, connecting it to real-world examples of passengers on crowded planes or cruise ships. Students then use this data to conclude how viruses spread and how to prevent viral outbreaks.
- The materials outline how the students use scientific and engineering practices (SEPs) to investigate grade-level appropriate content concepts. For example, in Unit 5, Concept 2 (DNA), Lesson 3, students design and construct a model of DNA. The activity is multipurpose; students both review and teach their knowledge of DNA and make the explicit connection to how scientists and engineers use scientific models to better understand phenomena and generate future discoveries. Another example is the Biology lesson from Unit 6; Concept 2 provides various opportunities to develop, practice, and show mastery of the SEPs. It begins with the phenomena of hidden companions and asks students various questions. The students then

complete a KWL chart about the skin microbiome. Afterward, they are asked to make a claim based on one of their initial questions from the phenomena. Students are then asked about using models to show how this microbiome operates. Students then use this model to make observations and collect data. At the end of the lesson, there is a check for understanding.

- Lesson 8 includes practice questions that ask students to define what would happen in certain genetic abnormalities. Students must apply what they know about enzymes and DNA to determine what would happen due to certain diseases in the body. Lesson 8 details the genetic engineering process to create customized DNA. Students practice as if they are working geneticists.

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 material strategically develops students' content knowledge and skills as appropriate for the concept and grade level or course outlined in the TEKS. Course-level content knowledge and skills are taught using SEPs and recurring themes so students can build and connect knowledge and apply it to new contexts. For example, beginning in Unit 1, Lesson 2, students engage in hands-on lab activities. They collect and analyze data and practice safety procedures while they study the effect of temperature and pH on enzymes, leveraged throughout the course.
- The materials are systematically designed to develop and build student skills and content knowledge using phenomena appropriate to the grade level outlined in the TEKS. For example, the materials include a program guide that details the use of all scientific and engineering practices that are appropriate for the grade-level TEKS within lessons and units of instruction. At the beginning of each unit concept, there is a teacher overview that connects to the objectives of the concept. Each overview contains scientific and engineering practices. For example, in Unit 4, Concept 2, students are expected to "Refine their initial scientific explanation about the investigative phenomenon of how plant systems and structures perform the functions of transport, reproduction, and response."
- The table of contents shows the TEKS linked to each lesson. By clicking on a standard from the table of contents, all of the textbook's lessons about that standard are displayed on the TEKS tab for Discovery. Strategic material alignment is within the units' 5E layouts and the teacher lesson planning document. Each concept within the lessons follows the 5E model of instruction, where students ask questions and make claims in the Engage section, followed by the Explore, where students receive content information and conduct an activity and complete investigations. Next is the Explain section, where students revisit their claims and use evidence to validate and revise, followed by the Elaborate section, where students apply the learning to a STEM project or analyze given models. These lessons end with the Evaluate section, which is a summative assessment.

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.

- Each concept within a unit has lessons presented in a 5E model rooted in an engaging phenomenon, followed by hands-on and digital exploration lab experiences and an explanatory mini-lesson, ending with evaluation options, including projects, written assessments, and other forms of assessment. For example, in Concept 2 (Evolution), Lesson 1, students will ask questions about how evidence—including common ancestry in the fossil record and from

homologies, biogeography, and genetics—explains evolutionary mechanics that result in varying rates of change and speciation. Students review different examples of evolution. Then, students select a question about the phenomenon and construct an initial explanation and/or model to answer the question. As the concept progresses, students come back to refine their explanation or model.

- The curriculum 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. For example, in Unit 4 (Plants), Concept 2, Lesson 3, students predict which plants will quickly transport water. They then conduct an experiment to assess their prediction. In another lesson, students make an initial claim based on genetic engineering, conduct a lab on bacterial transformation, make predictions about bacterial growth, and apply the knowledge to genetically modified organisms.
- The phenomena-based curriculum allows for student inquiry and questioning opportunities throughout the different units of study. There are systematically placed checks for understanding embedded within the curriculum lessons that allow for formal and informal assessments of students' learning and embedded scaffolding opportunities if needed. For example, students conduct hands-on labs in Lesson 2: Explore, Hands-On Activity: Investigating Respiration in Yeast. This lesson requires students to conclude based on their observations and solve issues.

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Indicator 2.2

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

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

Meets | Score 4/4

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

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

Evidence includes but is not limited to:

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

- The materials support students in the authentic application and performance of scientific and engineering practices at the grade-level content outlined in the TEKS. All units are based on concepts that follow the 5E model; this encourages students to engage in authentic applications of scientific practices throughout the unit. For example, in Unit 4: Plants, Concept 2: Plant Form and Function, the unit lessons are designed in a 5E approach beginning with an Engage activity named Survival of the Saguaro.
- The materials include phenomena that connect to the unit and lesson-level real-world scenarios. Each concept within a unit begins with an Engage lesson that anchors students with a real-world phenomenon. For example, in Unit 7, Concept 2, Lesson 1, students identify a real-world phenomenon about evolution. They ask questions, collect evidence, and develop a model and/or explanation to explain their findings. Throughout the rest of the concept lessons, they come back to refine their work. By doing so, they engage in the scientific practice of asking questions. Another example is Unit 1: (Life's Foundations), Concept 1: The Chemistry of Life. The stated Engage phenomenon is Carbon on Mars. This phenomenon is on the ongoing search for carbon on Mars, a current scientific investigation conducted by NASA. Another example of a

lesson is on the phenomena of fossils and evidence of change. Throughout the lesson, the students respond to various questions and situations, such as: 1) How do scientists analyze the effects of environmental change on biodiversity to explain the evidence of varying rates of change in the fossil record? 2) You are probably very familiar with landmarks and distances in your hometown. How can we use a map of familiar places to model the periods in Earth's history? Finally, in a lesson on Discovering Homeostasis, students look at a thermal image and notice that different parts of an organism have varying temperatures. Students develop ideas about the interdependence of system parts in the body and how they work together to regulate internal processes and maintain homeostasis during internal and external changes such as temperature. They select one of their questions about the phenomenon and construct an initial explanation and/or model to answer the question. During the rest of the concept's lessons, students revisit and refine this model.

- Additionally, STEM project starters are embedded in most units of study to help facilitate and build up students' engineering skills. For example, in Unit 5 (Heredity), Concept 4 begins with possibly applying genetic engineering to crops. This lesson asks students to think through the genetic manipulations needed to create certain characteristics in a population.

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

- Within each Engage component of each lesson, teachers receive guidance on how to elicit students' prior knowledge. Each lesson has a Setting the Purpose section, which guides teachers in connecting to students' prior knowledge. For example, in Unit 1, Concept 1, Lesson 1, teachers are provided with prompts to help students brainstorm a basic list of requirements for life. This section contains prompts to help students connect to content from previous science courses, such as ecosystems or human body systems. Another example is in Concept 1 (Cell Structure and Function), Lesson 1: Discovering Cell Structure and Function: Thinking About Cell Structure and Function; students are asked to complete a KWL chart to discern what they already know about the phenomenon and what they want to know. This activity allows the teacher to review prior knowledge and deepen the students' understanding through what lingering questions they still have.
- The Setting the Purpose lesson of each lesson facilitates teachers supporting students in knowledge building by authentically applying scientific knowledge across lessons. For example, in Unit 1, Concept 1, Lesson 4, teachers are guided to help students connect a model of something with a base and the relationship between structure and function, which applies to biomolecules also. This supports students in building knowledge. For example, in Unit 2, Concept 1, Lesson 2, teachers are guided to help students decide which image represents prokaryotic or eukaryotic cells. This, in turn, leads to the lab for classifying cells.
- The curriculum materials intentionally leverage students' prior knowledge and experiences related to phenomena and engineering practices. For example, In Unit 1 (The Chemistry of Life), the teacher is guided to elicit prior knowledge from students, using a chalk talk activity, of what carbon is by having students brainstorm as many molecules containing carbon as they can think of and record their ideas on the board.

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

- The materials clearly outline for the teacher the scientific concepts and learning goals behind each phenomenon that corresponds to content concepts across the course. Each unit concept

begins with a teacher overview that outlines the real-world phenomenon, concept objectives, vocabulary, and standards. This ensures teachers see the scientific concepts and goals behind each real-world phenomenon. For example, in Concept 1 (Cell Structure and Function), Lesson 1: Discovering Cell Structure and Function, there is a section called Explaining the Real World Phenomenon. More information about this section lives in the Lesson Planning link. The teacher guidance gives clear instructions about how to facilitate this piece to ensure students generate a model and focus on how each part links to the concept and their understanding of how the systems come together to function.

- Lessons provide an outline for the teacher of the scientific concepts and goals behind each phenomenon and engineering (STEM Project Starter) problem. For example, in the concept tile for the STEM project, the teacher planning material outlines the purpose and facilitation guidelines for the teachers. In Unit 4, Concept 1, the Setting the Purpose asks the teachers to lead the students in discussing the release and storing of carbon before the project begins.
- Each lesson contains a lesson planning section within it. The Engage lessons have a section called Explaining The Real World Phenomenon. This section guides teachers to facilitate students breaking down the application of the phenomenon to the unit of study by using scientific and engineering practices such as reviewing evidence and drawing upon theories and laws. For example, in Unit 4: Reproduction, Concept 1: Asexual and Sexual Reproduction, the teacher overview breaks down the application of the phenomenon One Dog Is Not the Other and relates it to genetic reproduction. Additionally, it guides the teacher and lets them know what concepts are covered in the lesson and what students should be able to do by the end. One example is asking questions about the significance of meiosis in increasing diversity in populations and about interactions among systems in animals that perform various functions.

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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 design of the course allows for the building of knowledge with opportunities for content connections between the concepts over the year. For example. in unit 2, each progressive concept builds on the other, such as concept 2 (cell division) building on concept 1 (cell structure and function). The materials connect new learning to previous and future learning goals within each unit's overview for each concept, which details these connections providing explicit connections to previously taught components.
- The materials connect learning to prior learning and explicitly connect learning across units through the "Setting the Purpose" section of the lesson guides which detail these connections and provide guidance for facilitating these connections. For example, in unit 5, lesson 2, students learn about sexual and asexual reproduction. This lesson builds on previous knowledge from unit lessons on heredity. The lesson guide explicitly states, "Remind students that in the previous unit they learned about plants including a lesson on plant reproduction. Also, remind them that reproduction occurs because of interacting biological systems." Another example is a lesson on heredity from Unit 5, Concept 3 (Lessons 1 and 2), where the teacher asks the students to recall prior knowledge about heredity and genetics and to ask questions about their role in cancer. The lesson makes connections across units by stating, "Remind students that they have built a conceptual foundation for this concept by studying interactions of biological systems in Unit 3 and plant reproduction in Unit 4 Plants." Also, in the activity "How does the

Environment Influence Populations of Organisms over Multiple Generations?," the materials meet the indicator by explicitly listing the connections of changes in populations versus individuals in Concept 2, Lesson 2 of Unit 7 to Unit 5: Heredity and DNA and to biological changes within a breeding population.

- The 5E model is present in each unit which is designed for students to build and connect their knowledge and skills within units.For example, in Unit 1 (Life's Foundations), one can find lessons that transition through the engage, explore, explain, elaborate, and evaluate components of the 5E model. This process is repeated throughout each lessons to connect and build on the content knowledge through authentic inquiry. This natural progression of inquiry through the lesson allows students to explore and build upon the science concepts in an authentic and organized way.
- In addition to the overviews within the lesson guides there is an additional scope and sequence one pager that helps guide teachers in their understanding in how TEKS progress throughout the course of the school year. For example, within the concept, “Cell Structure and Function” within the “Cells” Unit, standards 5A and 5B must be taught prior to 4A, 4B, 6A, 6B, and 6C which all occur within the concept, “Cell Division” within the “Cells” Unit.

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

- The materials are organized into cohesive units. Each unit contains concepts structured into lessons that follow the 5E framework: Engage, Explore, Explain, Elaborate, and Evaluate. Each unit begins with an Engage lesson that connects to a concrete, real-world example before moving into more abstract concepts. For example, in Unit 6, concept 2, students study ecosystems. Students begin by considering a familiar ecosystem--a local park. This concrete representation is an anchor as students progress through more conceptual learning about the relationships within an ecosystem. As another example, in Unit 3 (animals), Concept 2 (homeostasis), students begin by reviewing thermal heat maps to consider what homeostasis looks like in different situations. They then engage in labs to understand the concept of negative feedback loops and heart rate and homeostasis before scaling up to increasingly conceptual knowledge when they understand the purpose of homeostasis and how multiple body systems work together to create homeostasis. Students can develop conceptual understanding by scaling up from the concrete to the more abstract.
- A final example is Unit 7: Life's Diversity is broken apart into a total of 2 concepts, then each concept is broken apart into 13 lessons plus a concept check using the 5E instructional model. Each concept within a unit begins with an engaging lesson that helps root student understanding in a concrete phenomenon and elicit prior knowledge of the concept. Following an engage, explore activities are hands-on activities that have students dive into more abstract content associated with the concept in a way that allows students to discover connection through experience, forming knowledge on their own.
- The curriculum materials are intentionally sequenced to scaffold learning in a way that allows for an increasingly deeper conceptual understanding, engaging in scientific and engineering practices, connecting to recurring science themes, and developing an understanding of core scientific ideas. For example, in the scope and sequence, the sequential progression of TEKS and concepts can be seen, as well as the spiraling of TEKS into sequential units of study. These units are broken apart into lessons within the unit.

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- The materials include a Scope and Sequence that details all the textbook's biology concepts and follows the micro-to-macro approach for Biology. The materials begin with the foundations of life, then go to cells, then followed by animals, then plants, heredity, evolution, and ecology. These topics are built onto one another throughout the text to ensure the concepts lend themselves to deeper understanding as they start from the smallest forms of life to eventually look at entire ecological systems.

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. This can be seen in the Teacher Program Guide, which is accessible via the Course Materials tab on the main page of the teacher's textbook. That helps teachers lead students to learn via science instruction by breaking down the course-specific core concepts, science and engineering practices, and recurring themes and concepts within the curriculum materials. It orients teachers as to how the course is set up so that each unit is divided into concepts, which each contain a series of lessons and the intentions behind the flow and presentation of the course-specific core concepts and science and engineering practices. The SEPs are integrated within each lesson type to ensure students follow a set learning sequence for each new concept. The materials also include a scope and sequence that details the core concepts and how they build on one another. These concepts are further supported by the phenomenon and real-world connections to science and engineering practices in each unit. For example, in Unit 7: Life's Diversity, Concept 2: Evolution, Teacher Overview, teachers are introduced to the course-specific core concepts, science and engineering practices, TEKS, and concept objectives aligned to the unit of study and the concept being covered, in this case, evolution. The real-world phenomenon "The Largest Animal" helps students relate the biodiversity of whales to the process of evolution at different scales and the various processes underlying speciation and adaptation.
- The materials use the 5E (Engage, Explore, Explain, Elaborate, Evaluate) instructional model for sequencing science instruction within each unit. Each unit follows a predictable set of learning. Instruction in each concept launches real-world phenomena that generate student questions. For example, in Unit 5, Concept 2, students learn about DNA. During the Engage lesson, students anchor how DNA connects to fighting crime. They then Explore by building a hands-on model of DNA and Engage with several lessons to answer key questions about DNA (such as, "How do Nucleotide Sequences in DNA specify human traits?") before going into Explain lessons in which they explain the structure of DNA. The concept ends with Elaborate lessons where students explain their learning (in this case, by engaging in an assessment and applying DNA to a real-world example). They end with Evaluating lessons, which includes an assessment. This cycle repeats for each concept.
- The materials clearly and accurately present course-specific concepts, as seen through the TEKS alignment tool. This tool displays what concepts in the Biology textbook the Biology TEKS applies to.

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 and ELPS are introduced within the program and their alignment for each unit. For example, in Unit 2: Cells, Concept 2: Cell Division,

the TEKS 1.F, 2.B, 2.C, 3.A, 3.B, 3.C, 4.A, 4.B, 6.A, 6.B, and 6.C are covered as well as ELPS 2.I, 3.H, and 4.G. Another example is "Explain how the body maintains homeostasis for thermoregulation, reproduction, and blood sugar levels." that aligns with the TEKS B.12.A: "Analyze the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals."

- The materials provide unit objectives for each unit and student learning objectives for each lesson. For example, the learning objective for Unit 5, Concept 1, Lesson 1 is that students will be able to "ask questions about the significance of meiosis in increasing diversity in populations and about interactions among systems in animals that perform various functions." Another example is Unit 3: Animals, Concept 1, Teacher Overview. There are listed concept objectives to help the teacher assess mastery of TEKS for each concept covered in the Unit lessons.
- The materials have formative and summative assessments built into each unit. Each lesson ends with a check for understanding. The materials provide requirements for mastery of the materials within the lesson planning document of each lesson in the learning objectives section. For example, in Unit 6 Ecology, Lesson 2 houses the check for understanding at the end of the lesson for a quick review of what the students understand and what they still need more support to grasp. The concept check-in takes care of the summative assessment, such as in Unit 6 Ecology, Concept Check-in: Nutrient Cycles: Summative Assessment.

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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.	M
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

Meets | Score 6/6

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

Materials support teachers in understanding the vertical alignment of course-appropriate prior knowledge and skills guiding the development of course-level content 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 scope and sequence contain TEKS and explicit connections to how skills are taught before or after biology. It details which TEKS are taught in each unit, including TEKS that cross over into other units and concepts of the study, and the curriculum and scope and sequence explicitly name vertical alignment to previous courses of study and future courses of study. There are named supports to connect what was taught and how it links to previous science courses. Each unit concept contains objectives for that concept, and states the connection to how standards are taught in primary school science, middle school science and subsequent high school science courses. For example, in the Discovery Education_TX_Vertical_Horizontal Alignment guide it provides vertical and horizontal alignment for all grades from kindergarten on. In the plant basic needs topic from unit 4 concept 1, the document shows that the unit is aligned to K.13.A identify the structures of plants, including roots, stems, leaves, flowers, and fruits. In another example, the 8th grade standard, "8.13.C describe how variations of traits within a population lead to structural, behavioral, and physiological adaptations that influence the likelihood of survival and reproductive success of a species over generations" is developed in biology Unit 4, Concept 3: Plant Form and Function.

- The curriculum materials provide support for teachers in understanding the vertical alignment of course-appropriate prior knowledge and skills and the development of course-level content and scientific and engineering practices. For example, in the Discovery Education_TX_Vertical_Horizontal Alignment guide it clearly states the SEPs and RTCs connections to specific units from Kindergarten through 8th grade. For example, the 8th grade standard, “use mathematical calculations to assess quantitative relationships in data” connects to the 8th grade units, “Unit 1: Applying the Laws of Motion, Unit 1: Classifying Matter; Acids and Bases and Unit 4: Cell Functions; Ecosystem Changes.” These same SEPs and RTCs are taught in biology in 4 units: Unit 2: Cellular Respiration, Unit 4: Interactions of Biological SystemsUnit 5: Non-Mendelian Genetics and Unit 7: Evolution.

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 a lesson planning section for teachers with guidance on student misconceptions. For example, in the Unit 1 lesson on enzymes, teachers are provided with a section detailing possible student misconceptions (for example, that enzymes cause chemical reactions that would not otherwise occur on their own) and how teachers can respond. Also, Unit 2, Lesson 3 (Evaluating Scientific Models of the Cell), has misconceptions listed in the lesson plan for the teacher. These are very detailed and specifically target the lesson at hand. Finally, in Unit 2 (Cells), Lesson 1 Engage: "Discovering Cellular Respiration" includes misconceptions in the teacher's lesson plan. The section on Setting the Purpose also includes misconceptions. The lesson discusses how vitamins give us materials to produce energy, but they cannot give our bodies energy in solitude. Then it describes the correct process for creating energy.
- Materials contain explanations and examples of science concepts, including exemplar student answers to support teachers' content knowledge. For example, in a lesson on natural selection and adaptation, teachers are provided with exemplar student responses for each question (written or verbal) that students will be asked. This supports teachers in building content knowledge to ensure they have accurate look-for in student responses. Another example is in Unit 5: Heredity, Concept 1: Asexual and Sexual Reproduction, Lesson 1: Discovering Asexual and Sexual Reproduction, the Lesson Planning Document guides the teacher in the lesson objective, TEKS alignment, how to facilitate the activity and setting the purpose of the activity, directions on facilitating learning via a KWL chart activity, and how to explain the real-world phenomenon and relate it to the concepts being explored in the unit using evidence, relationships, theories and laws, and applying cause and effect of asexual and sexual reproduction. Also, in Unit 4, Concept 2, Lesson 6 (plants influenced by light), teachers are provided with some student responses for each question that students will be asked. This aids teachers in building content knowledge to ensure they have accurate criteria to evaluate student responses. Finally, in Unit 4, Concept 1, Lesson 3, the misconception about the human skeletal system includes that bone is dead tissue and that the skeletal system only consists of bone.
- The curriculum materials contain explanations and examples of science concepts to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS. For example, in the lesson planning document for Unit 6: Ecology, Concept 2: Ecosystems, Lesson 8: Explaining Nutrient Cycles, the teacher is provided with probing questions to ask the students to check for understanding and provides student exemplar

answers to help the teacher in determining the validity and completeness of students answer to probing questions.

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

- The curriculum materials explain the intent and purpose of the program's instructional design. For example, in the Course Materials Guide, the program guide thoroughly describes the program's instructional approaches and references the researched-based strategies present in each unit. It contains the structure of units and lessons, an overview of the digital materials, sections on the TEKS and SEPs, the rationale for phenomenon-based learning, assessment resources, guidance on instructional best practices to support student learning, and the intent and purpose of the 5e instructional framework.
- The program guide details the sequence of the textbook and how it works to assist teachers in covering the topics to mastery. The 5E lesson model strategy was implemented for this textbook. Materials give reasons to support the model, stating that "lessons are designed to pique student interest and scaffold acquisition of specific scientific ideas as students learn about the world in which they live." The guide details how the selected organizational tools help align the materials to the TEKS and concept mastery. The program guide also describes how to use the phenomena in lessons. The purpose of phenomena is to ensure teachers understand that science learning should mirror the work of a scientist. Students are encouraged to ask questions and develop models to verify their thinking and behaving as scientists do in the field.
- The lesson planning document provides a layout of the materials under the sections titled "Facilitate the Learning" and "Setting the Purpose." Looking at Unit 1, Concept 1, Lesson 4, the materials suggest that the teacher reinforce the concept of structure and function and provide steps to conduct the hands-on activity for creating a carbohydrate model. Another example is in Unit 6: Ecology, Concept 2: Ecosystems, Lesson 8: Explaining Nutrient Cycles; the lesson planning document provides the teacher guidance on the student objective for the lesson, recurring themes present in the lesson, and guidance on setting up and facilitating student learning in the activity "Stability and Change in Nutrient Cycles," an interactive exploratory activity that explores how "scientists use themes and evidence to communicate scientific explanations to broader communities."

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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 provide a definition of sensemaking and identify specific sensemaking behaviors of students. For example, in the program guide, the materials define sensemaking as when "Students build their understanding of science ideas through the process of developing and revising explanations and models." The materials explain why this is so essential for student learning. In the program guide, materials also explain that each course concept requires students to either develop a model or write an explanation.
- The materials consistently provide learning activities that support students' meaningful sensemaking through a natural progression of the 5E instructional sequence. Each course concept begins with an Engage lesson in which students are introduced to a real-world phenomenon and either develop a model or write an explanation for it. For example, in unit 1, concept 1 (The Chemistry of Life), students are introduced to the question of whether there is

life on Mars and develop questions around this topic. They then engage in sensemaking by developing a model or explanation to answer one question; they will revise their thinking throughout all of the lessons in this concept. Another example is in Unit 4, Plant Concept 1 Photosynthesis Lesson 4. Here, the Explore activity has the students reading information about photosynthesis, collaborating with classmates, then analyzing the data they have collected. Finally, in Unit 1, Life Concept 3 Cellular respiration lesson 1, the students are asked how cells facilitate the breakdown of food to extract usable energy. Next, students are asked to create a model to answer a question they have.

- The curriculum materials consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers. For example, In Unit 2: Cells, Concept 2: Cell Division, Extension: STEM Project Starter: "Modeling the Cell Cycle in Growth and Development," students design, conduct, and investigate how to "...determine the impact of environmental factors on the rate of mitosis in onion cells." Additionally, In Concept 5: Genetic Disorders and Technology: Lesson 6, students act as scientists to predict the inheritance of genetic disorders in humans. The lesson is 45 minutes long, and students are asked to read, write, think, and act like a scientist as they review different practices for determining inheritance, answer questions about their learning, and think about the processes they are practicing. Also, in Concept 1: The History of Life on Earth: Lesson 3, students follow the process of fossilization to map out the history of organisms. They have activities to follow how scientists define each organism and its relatives. They make sense of these ideas through reading, writing, thinking, and acting like scientists as they follow their findings and conclusions in the fossil mapping process.

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

- The materials provide opportunities for students to engage in purposeful and targeted activities with appropriate scientific texts appropriate for the grade level/course. Most lessons have expository text providing background information as part of each lesson and are paired with targeted activities to help engage students in thoughtful work. For example, in Concept 1, lesson 7 (What Are the Characteristics of Carbohydrates, Lipids, Proteins, and Nucleic Acids?), students read about the structure of carbohydrates, lipids, proteins, and nucleic acids. As they read, they complete a graphic organizer and then answer a check for understanding questions. This provides necessary background knowledge for the next lesson, in which students explore the role of enzymes. This can also be seen in Unit 1: Life's Foundations, Concept 1: Discovering the Chemistry of Life "Thinking about the Chemistry of Life," in which students read an expository text about the importance of carbon in supporting life and then complete a KWL chart and make an initial claim or model. Finally, in Unit 7: Life's Diversity, Concept 1: The History of Life on Earth, Lesson 1: "Discovering the History of Life on Earth" includes the expository text "The Mystery of Living Fossils" and "Thinking about the History of Life on Earth." The expository scientific texts are paired with a KWL chart that students complete as they read and annotate the texts. Then students view the phenomenon and construct an initial explanation and/or model to answer the question.
- The materials provide multiple opportunities for students to engage with scientific texts to gather evidence and develop an understanding of concepts. For example, in Unit 3 (Animals) Concept 1 (Interactions of Biological Systems), students read texts about many body systems and how they interact (including the lymphoid, digestive, endocrine, reproductive, and integumentary) as background before exploring defenses against foreign invaders and then

ultimately, crafting an explanation for a real-world phenomenon related to these interactions. Next, in unit 7 (Diversity) concept 1, "History of Life" Lesson 4, the students are presented with information about phylogeny, then make predictions and gather data. After that, students are asked to present their data, make an analysis and answer practice questions. Also, In Concept 1: The History of Life on Earth: Lesson One, the students are reading about the history of fossils and the mysteries they bring to scientists. Students have a clear objective for each lesson and dive in for a deeper understanding of the concepts with built-in checks for understanding the teacher can use to check for the development of conceptual knowledge. Finally, in Concept 1: The History of Life on Earth: Lesson Three, the students are reading about the mapping of life's history and what scientists have learned from fossil records. The students go through a series of fossil records to gain a deeper understanding of how scientists have used what they have found to map out the history of organisms on Earth.

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 in written and graphic modes by conducting investigations where evidence is documented in written and graphic modes. Students record their ideas, questions, drawings, charts, and graphs on their student investigation sheets in order to analyze data, draw conclusions and discuss and revise their understandings at various stages of the lesson. Most concepts have hands-on investigations as part of the 5E lesson cycle. In Unit 2, Concept 3, Lesson 3 (Hands-On Lab: Photosynthesis), students make predictions, then write down data as they conduct their activity. Also, in Concept 1: The History of Life on Earth: Lesson 3, the students are taken to a digital activity that showcases the history of life on Earth. The evolutionary path is laid out to give students a visual picture of when each type of life appeared on Earth. This visual description is accompanied by text to explain the process and give students a better understanding of how it all occurred.
- The materials provide multiple extension activities with STEM project starters. For example, in one STEM project starter (STEM Project Starter: Conditional Plant Growth), students are asked to work with a team to design a terrarium-style greenhouse in which they will monitor seed germination and plant. Students write a description of their design, collect and graph their data, and write an analysis of results and a conclusion. Also, in Unit 2: Cells, in Lesson 1: Discovering Cell Structure and Function, students read the excerpt titled "Thinking About Cell Structure and Function," then create a KWL chart around the real-world phenomenon. Students are then asked to revisit the chart as they gather evidence in later lessons.
- The materials provide multiple opportunities for students to communicate thinking on scientific concepts in written and graphic modes by conducting investigations where evidence is documented in written and graphic modes. Students record their ideas, questions, drawings, charts, and graphs in student notebooks in order to discuss and revise their understandings at various stages of the lesson. This can be seen in the Hands-On Labs and STEM Project Starters present in the curriculum materials. For example, in Unit 7: Life's Diversity, Concept 1: The History of Life on Earth, Lesson 2: Hands-On Activity: Constructing a Timeline of Life, students "Use a geographical map to represent the scale of time and to construct a timeline of major events in the rise of animals on Earth." Also, in Unit 5, Heredity Concept 1 Reproduction Lesson 1, students create a Know/Want to Know chart, then create a model explaining cause & effect.

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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 provide authentic student engagement and perseverance of concepts through productive struggle while acting as scientists and engineers by beginning the unit with phenomena and asking the student to engage in the engineering process. For example, in Unit 5 (Heredity), Concept 4 (Genetic Engineering), students engage in a hands-on lab (lesson 2: Transforming the Bacterial Genome) in which they explore how scientists have acted as genetic engineers by creating transgenic bacteria. Students then transform bacteria. After conducting their lab, students reflect on their process by answering questions such as, "Did you make any mistakes in your experiment? Could you explain the results that you observed, even if they were not what you expected?". Also, in Unit 7 Diversity Concept 2 (Evolution), Lesson 12 claims antibiotic resistance and natural selection based on data. Students then have to support their claims with evidence. Students are also asked to explain the trend in data. In Concept 1: The History of Life on Earth: Lesson 10, students evaluate how fossils provide evidence for common ancestry. Students review different homologous structures that scientists have used to determine ancestry.
- 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. This can be seen in Unit 5: Heredity, Concept 1: Asexual and Sexual Reproduction, Lesson 4: Hands-On Lab: Modeling Cellular Processes of Reproduction. "In this investigation and a series of stations throughout the classroom, you will observe, model, and interact with concepts related to reproduction, including asexual reproduction, the stages of meiosis, and a nondisjunction event." Students then engage in discussion in small groups to " discuss their observations, addressing any inconsistencies in data and unexpected results." Additionally, in Unit 4: Plants, Lesson 3: Hands-On Lab: Photosynthesis, materials engage students to make sense of concepts through productive struggle as they Investigate how energy is transferred and matter is conserved during photosynthesis. Students ``predict what will happen to the leaves when they are exposed to light," collecting data on the effects of light on photosynthesis rates. Then, students analyze their collected data and discuss, in small groups, "observations, addressing any inconsistencies in data and unexpected results' ' and make initial conclusions based on their collected data.

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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 the skill of using evidence to support their hypotheses and claims. For example, in Unit 6, Concept 2 Lesson 11 Explaining Ecosystems, students read through information that describes the three components of scientific explanations (evidence, reasoning, and claims). They then read about what makes for strong evidence before crafting a scientific explanation that uses evidence and answers one of the questions they generated in the initial Engage lesson that started the unit. Also, in Unit 4, Concept 2 Lesson 11 Explaining Ecosystems, students are specifically prompted to use evidence to construct a scientific explanation to explain the scientific questions they generated earlier in the unit. Across all units and concepts, students are prompted to write explanations using evidence in explanation lessons. Finally, in Unit 6 Ecology, Concept 1: Nutrient Cycles, Extension: STEM Project Starter: "Reducing Runoff" has students researching runoff reduction methods and using evidence to explain how these methods relate to the nitrogen and/or phosphorus cycles. In the STEM Project Starter "...students read the CIT. After completing the reading,

instruct students to research three runoff reduction methods and explain how the method relates to the nitrogen and /or phosphorus cycles."

- The materials prompt students to use evidence to support their hypotheses and claims using Claim Evidence Reasoning embedded in some of the exploration lessons. For example in Unit 2 Cells, Concept 1: Cell Structure & Function Lesson 2 - Explore, the students are asked to write a CER based on their observations from the Elodea leaf and yogurt lab as they complete the lab.
- Additionally, in Unit 6 Ecology Concept 1: Nutrient Cycles Lesson 8, the students revisit a claim made from the Engage lesson and provide a scientific explanation answering their own question generated during the Engage about nutrient cycling. Also, in Unit 7: Life's Diversity, Concept 2: Evolution, Lesson 11: Explaining Natural Selection and Evolution , students are specifically prompted to use evidence to construct a scientific explanation to explain the scientific questions they generated earlier in the unit. Across all units and concepts, students are prompted to write explanations using evidence in lessons.

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

- The materials present scientific vocabulary using multiple representations for students to develop an understanding of scientific terminology through an interactive glossary, which includes a detailed definition, context of use, etymology, images, videos, and animation associated with each vocabulary term. For example, the definition for carrying capacity contains a definition, key context, its root meaning, and a video showing a real-world example.
- The materials provide opportunities for students to apply scientific vocabulary within context. For example, in Unit 3, Concept 1, Lesson 5, students read about the different components of the digestive system. They then must use the associated scientific vocabulary words to answer questions at the end of the lesson. One example of a question is, “The digestive system must interact with other systems to absorb nutrients for energy and growth. Match the feature or property of the digestive system with the feature or property of another body system it interacts with.” They then repeat this process for each body system throughout the unit concept. Also, in Unit 7, Life’s Diversity, Concept 1: The History of Life on Earth, Lesson 5 Hands-On Lab “Analyzing Evidence for Common Ancestry,” the students “analyze and evaluate how anatomical, molecular, and developmental homologies can serve as evidence of shared ancestry among related organisms.” Students must use newly acquired scientific vocabulary to answer analysis questions associated with the hands-on activity. Similar opportunities are seen embedded throughout the curriculum materials.
- Finally, the terms asexual and sexual reproduction in Lesson 2, Comparing Asexual and Sexual Reproduction, includes vocabulary in the context of the lesson. The lesson reads, “In the activity below, you will compare sexual reproduction (which includes meiosis) to asexual reproduction, where only mitosis takes place.” This statement describes where meiosis and mitosis are categorized for each type of reproduction. Then, the materials include a comparison chart of characteristics of asexual reproduction alone, asexual and sexual together, and just sexual alone. These differentiations allow students to better understand the vocabulary terms in context with their defining features.
- The materials include opportunities to utilize scientific vocabulary through the Check for Understanding questions embedded in the lessons. For example, in Unit 2 Animals, Concept 2: Homeostasis Lesson 5 - Explain, the Check For Understanding question utilizes matching with homeostatic mechanisms such as active transport, diffusion, and osmosis. Additionally, in Lesson 2, Comparing Asexual and Sexual Reproduction, students are assessed on using reproduction vocabulary terms within a scientific context.

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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 intentionally develop active science classrooms, with discourse as a key component across units and lessons. For example, in the program guide, teachers are guided through the importance of discourse to reaching course goals and the three types of discourse students will experience across lessons. An example of this is also found in Concept 4: Genetic Engineering - Lesson 1: Discovering Genetic Engineering; students are asked how genetic engineering could impact everyday life. This prompt asks students to review the findings and shared knowledge and determine an opinion of how this scientific knowledge could impact our environment.
- The materials integrate argumentation in all stages of the learning cycle, supporting student development of content knowledge and skills. For example, in Unit 6, Concept 1, Lesson 3, "Analyzing Effects of Disruptions to the Nitrogen Cycle," students explain why the nitrogen cycle is important to ecosystem stability and how changes in nitrogen sources affect the nitrogen cycle. After reading and studying multiple sources, they engage in academic discourse to answer key questions about the lesson objective. Also, in Unit 5: Heredity, Concept 1: Asexual and Sexual Reproduction, Lesson 5: "What are the Differences between Asexual and Sexual Reproduction?", students analyze the importance of chromosome reduction in increasing the diversity of sexually reproducing organisms. In the activity, "students read about the differences between sexual and asexual reproduction. Have them summarize the information in a Venn diagram." then, students apply what they learned to answer the question, "How might variation help populations of sexually reproducing organisms?", with possible student responses including help combat diseases, enable bacterial and viral disease resistance, and survive changes in the environment or diet.
- The materials integrate argumentation and discourse to support student development of content knowledge and skills using the 5E model. For example, Unit 3: Animals starts with an Engage into Discovering Interactions of Biological Systems, with phenomena of how the body maintains homeostasis while running. A KWL chart and probing questions are written by students, followed by an Explore hands-on activity over Investigating the Role of Saliva in the Digestive System, and an Explain activity in which students "Return to one of your questions from Engage and construct a scientific explanation or model to represent the answer to your question. You can select multiple methods of communication formats to describe your thinking: Physical or drawing of an annotated model, Oral presentation, such as a video of yourself, sharing with another student, a skit, or Online digital presentation". An Elaborate activity with a STEM Project Starter over "Eating the Large Things" is next, in which students "Research the types of cells that are used to destroy foreign invaders and build a 3-D model of these cells in action during the process of phagocytosis." Finally, an Evaluative activity has students answering questions about the interactions among systems in animals.
- The materials include targeted discourse on ethical dilemmas for scientists. In Concept 4, Lesson 1, "Discovering Genetic Engineering," students are asked to think about "Bioethics: Manipulating genomes has opened the door to many possibilities—and even more ethical concerns. Some of the possibilities are easy to embrace, like new treatments for diseases or transgenic bacteria that can help clean pollution from the environment. Others are more complex. Are higher crop yields worth it if transgenic resistance genes encourage farmers to overuse chemicals? Do agricultural companies have the right to prevent farmers from saving the seeds of GMO plants?" These topics give rise to discussions about what is ethically correct in science and help students develop their content knowledge.

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

- The materials provide opportunities for students to justify explanations of phenomena and solutions to problems using activities structured following the 5E model. In each Explain lesson, students create arguments to explain the phenomenon that started the unit concept. For example, in Unit 1 Concept 2, the Engage lesson begins with students reading about thermal images and how they provide insight into how organisms maintain homeostasis by regulating temperature. They then craft possible questions pertaining to this topic. At the end of the lesson, students write initial claims to answer their questions. Throughout the unit, students learn about related content and then, in the Explain lesson, craft a scientific argument to refine their initial claim. Also, this can be seen in Unit 5: Animals, Concept 1: Interactions of Biological Systems, where students explore how the body maintains homeostasis when a runner participates in a marathon. The unit wraps back around to the phenomena in the Explain, where students are tasked with “Return to one of your questions from Engage and construct a scientific explanation or model to represent the answer to your question. You can select multiple methods of communication formats to describe your thinking: Physical or drawing of an annotated model, Oral presentation, such as a video of yourself, sharing with another student, or a skit, or Online digital presentation.” Another example, in Unit 2 Cells Concept 1: Cell Structure and Function - Explain, students, revisit the unit phenomena over human hibernation and then “return to one of your questions from Engage and construct a scientific explanation or model to represent the answer to your question. You can select multiple methods of communication formats to describe your thinking: Physical or drawing of an annotated model, Oral presentation, such as a video of yourself, sharing with another student, or a skit, or Online digital presentation”. Also, in Concept 4: Genetic Engineering - Lesson 1 “Discovering Genetic Engineering,” students are asked to “explain real-world phenomena” by reviewing the examples from the textbook and to select a question they have about a phenomenon and create a model to answer the question. As they move through the lesson, they have an opportunity to review the learning and revise their model.
- The materials provide specific opportunities to construct and present a verbal and written argument to problems using evidence acquired from learning experiences. For example, in Unit 1 Concept 1, Lesson 10, Explaining Interactions of Biological Systems, students are guided through the three components of a scientific explanation. They are given a rubric for each of the three components to ensure that their written arguments around explanations are strong. This type of thinking is repeated in each Explain lesson throughout the course. Another example is in Unit 2, Animals Concept 2: Homeostasis - Lesson 3, the students conduct a heart & temperature lab and then use their collected evidence to respond to questions such as “Why do you think the intensity of the exercise affects heart rate and body temperature? If you exercise for long amounts of time, you use a lot of energy. What systems would work to bring your energy reserves back to normal? How does your body temperature change during and after exercise?” These questions provide scaffolds for students on questions to answer to fully construct a sufficient explanation.
- Temperature? If you exercise for long amounts of time, you use a lot of energy. What systems would work to bring your energy reserves back to normal? How does your body temperature change during and after exercise?”

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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 Lesson Planning materials provide teacher guidance on questions to ask students, such as "Plastic is derived from carbon. Does plastic decompose in the environment and release carbon?" and provide sample student responses to questions such as "No, plastics do not decompose, so they do not release their carbon back into the environment." Finally, in Unit 2, "Cells," Concept 2: Cell Division, Lesson 3: Hands-On Activity "Investigating Genetic and Environmental Influences Lesson Planning," teacher guidance is provided on how to set the purpose of the lesson by asking students "Why would a transplant between identical twins have a better chance of success? "A possible student's response to the question might be, "The body of the recipient would recognize the genetic material from the donor skin during the transplant, and there will be a greater chance to accept rather than reject it." As students respond, teachers are guided to "Facilitate a discussion about how clones and twins are similar but different. Explain that identical twins share the same DNA but have different DNA from their parents. Clones are derived from one parent and have the same DNA as the parent."
- Materials provide teacher guidance on anticipating student responses and using questioning to deepen student thinking through the lesson planning document in the "Facilitating the Learning" section. For example, in Unit 4 Concept 1, "Photosynthesis," Lesson 8, the section suggests that teachers have students share answers and discuss any differences of opinion or

inconsistencies in answers. After students have completed their discussions of initial questions and explanations, teachers remind them that scientists typically work together and reach consensus explanations supported by evidence from data and observations. Finally, in Unit 3, “Animals,” Concept 2, “Homeostasis” Lesson 2: Explore activity, after students have completed the two-minute task, the material directs the teacher to ask, “How would the results be different if we had a larger or smaller hole in the cup?." The teacher can then allow students to share the questions they are trying to answer with each other. You can consider grouping students with similar questions to work with one another. As a group, they can help each other construct a valid and evidence-based claim statement. As they discuss, they should indicate evidence they have collected that supports their ideas.

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’ scientific vocabulary development to explain phenomena and analyze and evaluate concepts. For example, in Unit 7, “Life’s Diversity” Concept 1: The History of Life on Earth, Lesson 5 - Hands-On Lab: Analyzing Evidence for Common Ancestry, students “analyze and evaluate how anatomical, molecular, and developmental homologies can serve as evidence of shared ancestry among related organisms.” Students must use their newly acquired scientific vocabulary to answer analysis questions associated with the hands-on activity. Another example is in Unit 2: Cells, Concept 2: Cell Division, Lesson 5: How Does Cell Division and the Cell Cycle Relate to the Growth of Organisms? Check for Understanding: Cell Cycle Steps has students make "...observations of several cells in various cell cycle phases. Match the stage of the cell cycle phase with the description of the cell.” The activity allows students to use scientific vocabulary in the context of the concept being studied, including opportunities to use new vocabulary to explain phenomena or problems.
- The materials guide the teacher in supporting students’ use of scientific vocabulary in the context of exemplar responses. For example, in Unit 2 Concept 1, Lesson 6, teachers are provided with exemplary student answers with important vocabulary words from the lesson highlighted in red. All questions in the lesson, such as “What did you learn about each of these components of the plasma membrane?” are provided with exemplar answers using lesson vocabulary words. Teachers are also provided with guidance to support approaching learners with lesson vocabulary. They are guided to “Remind students that kinetics simply means motion, and extracellular means outside of the cell” to support students in reaching mastery.
- The materials provide an interactive glossary where students can access glossary terms in context. When they click on the vocabulary term, they are automatically sent to the interactive glossary and all the resources around it. Students also can see the definition, etymology, and key context for the term, which allows students to see the term being used in a sentence where the meaning is described. For example, in the “Mutualism” Unit, Concept 2: Ecosystems, Lesson 8: How Do Species Interact?, “Mutualism” is a term that the glossary provides more resources for student understanding. The interactive glossary includes details of the term, images, videos, and an animation. Resources provided include examples of a cape buffalo with birds, lichens on mudstone, and cows and parasites. This feature is capable of helping teachers to scaffold the learning by utilizing multiple descriptions of the terms in context and multiple examples.

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

- The materials use the 5E teaching model to help teachers support student discourse using evidence to construct written and verbal claims rooted in scholarly inquiry in every lesson. For example, Unit 3: Animals starts with an Engage activity titled “Discovering Interactions of Biological Systems” with phenomena of how the body maintains homeostasis while running. A KWL chart and probing questions are written by students, which is followed by an Explore hands-on activity over Investigating the Role of Saliva in the Digestive System, and an Explain in which students “Return to one of your questions from Engage and construct a scientific explanation or model to represent the answer to your question. You can select multiple methods of communication formats to describe your thinking: Physical or drawing of an annotated model, Oral presentation, such as a video of yourself, sharing with another student, or a skit, or Online digital presentation." Next, an Elaborate activity with a STEM Project Starter over “Eating the Large Things” in which students “Research the types of cells that are used to destroy foreign invaders and build a 3-D model of these cells in action during the process of phagocytosis.” All providing authentic opportunities and guidance to support students in using evidence to construct written and verbal claims.
- The materials provide teacher questions for supporting student discourse and using evidence in constructing written and verbal claims in every lesson where questions push students to use evidence to support their claims in writing and discourse. For example, in Unit 5, “Heredity” Concept 1: Asexual and Sexual Reproduction, Lesson 5 - What are the Differences between Asexual and Sexual Reproduction? Students analyze the importance of chromosome reduction in increasing the diversity of sexually reproducing organisms. In this activity, “students read about the differences between sexual and asexual reproduction, have them summarize the information in a Venn diagram.” then, students apply what they have learned to answer the question, “How might variation help populations of sexually reproducing organisms?” with student responses including help combat diseases, enables disease, bacterial, and viral resistance, and survive changes in the environment or diet. Also, in Unit 1, “Life’s Foundations” Concept 1: Chemistry of Life, Lesson 5, the discussion questions include “How did your predictions for each of the known positive and negative control samples compare with the test results from those samples? Why was it important to have both a positive and negative control sample? What sources of error might have been present in your lab group’s or your classmate’s experiments?”

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

- The materials provide teacher support and guidance to engage students’ thinking throughout collaborative lesson experiences within the course, develop student discourse around their thinking, and find solutions following a line of inquiry through the 5E instructional model. Each unit is presented using the model and is rooted in an engaging phenomenon. For example, in Unit 3, “Animals,” the lesson starts with an Engage activity, “Discovering Interactions of Biological Systems,” with a phenomenon of how the body maintains homeostasis while running. Students create a KWL chart and craft probing questions. This is followed by an Explore hands-on activity over Investigating the Role of Saliva in the Digestive System, and an Explain activity in which students “Return to one of your questions from Engage and construct a scientific explanation or model to represent the answer to your question. You can select multiple

methods of communication formats to describe your thinking." Next, an Elaborate activity with a STEM Project Starter (Eating the Large Things) has students "research the types of cells that are used to destroy foreign invaders and build a 3-D model of these cells in action during the process of phagocytosis." The lesson ends with a traditional Evaluative activity in which students answer questions about the interactions among systems in animals.

- Additionally, students have many opportunities to communicate their thinking and solutions in every lesson. In Unit 2, "Cells," Concept 1, "Cell Structure and Function," Lesson 7, the students share their claim about a model by selecting multiple methods of communication formats to describe their thinking. Some possible options are physical, such as a drawing of an annotated model; oral presentation, such as a video of yourself; sharing with another student; creating a skit; or an online digital presentation. Also, in Concept 1, "Nutrient Cycles," Lesson 3 - Analyzing Effects of Disruptions to the Nitrogen Cycle, the Analysis and Conclusions section provides multiple opportunities for teachers to ask questions and to give students the opportunity to expound on what they have learned. Each lesson has multiple opportunities for student thinking to be shared orally. Finally, in Concept 1, "Nutrient Cycles," Lesson 4 - Hands-On Activity: Modeling the Carbon Cycle, the students have the opportunity to share their thinking verbally while also discussing the solutions they have found in the activities. They are asked to record their data based on observations and discuss them with their groups. The teachers can also make this a class discussion once all the groups have formulated their responses.

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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 multiple quick formative assessments within each unit in a variety of formats to measure student learning and determine the teacher's next steps for instruction. For example, in Unit 7: Life's Diversity, Concept 1: The History of Life on Earth, Evaluate Lesson 13: Evaluating the History of Life on Earth. First, "Begin by having students summarize the key ideas that they have learned throughout the concept. Encourage students to record their ideas in the space provided. Then, have students talk with a group about the phenomenon they saw in Engage. Support them in discussing how what they have learned about the history of life on Earth could help them explain a variety of observations about common ancestry in evolution and describe the factors that account for varying rates of evolution over time. Now that students have achieved this concept's objectives direct them to review and practice the key ideas online. You may also assign students the summative assessment for this concept. In the summative concept assessment, students will answer questions about assessing the history of life on Earth." Secondly, teachers are guided to check for understanding by "Encourage(ing) students to review the concept review and complete the Student Self-Check practice assessment prior to assigning the Summative Teacher Concept assessment; Student Review and Practice Assessment, (or) Teacher Concept Assessments."

- Additionally, In Unit 6, Concept 2, Lesson 8, in a lesson on ecological interactions, students are asked: “Organisms in an ecosystem can form different types of relationships. Choose from the drop-down menu the term that best describes each of these ecological relationships.” This provides teachers with a short yet concise formative measure to assess student mastery of the content. Also, in Unit 7, Concept 2, Lesson 3, the resource has a cause & effect matching activity at the end of the lesson.
- The lessons also include “Check for Understanding” sections to provide quick and informal data for the teacher to gauge scholar mastery through a lesson. The items include many variations of answer choices, such as multiple-choice, matching, and short-answer questions. For example, in Concept 2: Ecosystems - Lesson 2: Identifying Feeding Relationships in Ecosystems, the students answer the questions in a multiple-choice format to inform the next instructional steps.
- The materials include formal summative assessments in a variety of formats to assess the learning of the whole unit. For example, in Unit 6, Concept 2, Lesson 10, students are asked to review data about changing temperatures in the Great Lakes. They then respond, “Predict how the change in temperature shown in the graph will affect moose populations around the Great Lake areas. Provide support for your reasoning.” Also, in Unit 2, “Cells,” Concept 2:Cell Division, there is an eight-question summative assessment with drag and drop, multi-select, multiple choice, and short constructed response questions. Teachers may also use the Assessment Builder tool, where they can choose from a vetted bank of items or can generate their own questions. Teachers may use these tools to create formative or summative assessments throughout the school year.
- The materials include diagnostic assessments in the form of KWL charts and Initial Claim or Model activities in the Engage lesson of each unit, providing teachers with information to monitor progress and identify learning gains in a variety of formats. This can be seen in Unit 7: Life’s Diversity, Concept 1: The History of Life on Earth, Engage Lesson 1: Discovering the History of Life on Earth, where teachers first “Engage students with stories of discovering fossils of species thought extinct, such as coelacanth, dawn redwood, and others. Then, “Encourage students to recall prior knowledge about fossils and the fossil record.” Second, teachers are guided to “Start a KWL Chart to record your ideas in this concept. In the “K” column, record what you already know about the real-world phenomenon. In the “W” column, record two to three questions that you want to know the answers to so that you can better describe the real-world phenomenon.” Third, “Depending on the readiness of the class, allow students to select one of their own questions, or select, as a class, a student-generated question for which to construct an initial scientific explanation or model. The explanation or model should show their initial ideas about how this phenomenon occurred. This will serve as a pre-assessment of students’ current level of understanding about the phenomenon.”

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

- The materials assess all student expectations by course materials, as outlined in the TEKS. This is evident by the cohesive scope and sequence that maps out and outlines what will be taught in a specific course. For example, in section 1 of Unit 2: Cells, the standards 1.A, 1.H, 2.A, 3.A, 3.C, 4.B, 5.A, 5.B are covered. The materials provide the TEKS correlation for each assessment item in the Lesson Planning documents. Teachers can create assessments that are closely aligned to standards. For example, in Unit 7: Life's Diversity, Concept 1: The History of Life on Earth, Evaluate Lesson 13: Evaluating the History of Life on Earth, the Lesson Objective states, "By the end of the concept, students should be able to: Identify the various kinds of evidence for common ancestry in evolution and describe the factors that account for varying rates of

evolution over the history of life on Earth." and the Texas Essential Knowledge and Skills aligned are B.7.A, B.9.A, B.9.B, B.13.D.

- The materials have built-in summative assessments in the final Evaluate sections of the lesson that show the aligned TEKS each question is assessing, followed by a description of the standard. These assessments include questions on the topic from the section and also showcase the DOK level for each. For example, the Concept Summative: Interactions of Biological Systems question 1 is aligned to B.12.A - analyze the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals.
- Also, in the materials In Concept 1 under Reports and Concept Reports, teachers have access to assessments based on the concepts in the materials. The TEKS are listed for each set of questions, and varied types of responses are required to fulfill the questions. The teacher can filter these assessments by concept or organize them by standards. This can also be seen in Unit 5: Heredity. There are five concepts with 5 concept check-ins. Each check-in covers a different set of TEKS. For example, Concept 5 assesses TEKS 7C & 8C, whereas Concept 4 assesses TEKS 7D and Concept 2 assesses TEKS 6A & 7A.

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 in the real world. For example, in Unit 1, Concept 1, Lesson 11, students are asked to explain what scientists can learn from investigating the role of enzymes and other proteins in facilitating cellular processes. They then engage with a real-world example around researchers designing drugs and answer a series of questions, such as, "What other characteristics would have to be taken into account before a new formulation would be considered better than the original?" to apply their knowledge.
- Additionally, in unit 2, concept 1, in the concept check-in, students are assessed on TEKS standards 5A and 5B. Students have assessed a variety of questions, including "Compare and contrast the autogenous theory to endosymbiotic theory." This can also be seen in Unit 1: The Chemistry of Life, Concept 1, Elaborate Extension STEM Project Starter, where science and engineering practices are integrated into a project that has students "Research a disease caused by an enzyme deficiency, including effects and treatments, and use research to write a report about the disease and its treatment."
- The materials include assessments that integrate scientific concepts and science and engineering practices through hands-on activities embedded throughout the concepts. For example, in Unit 4, Concept 2, Lesson 3, the students are making predictions, gathering data, and drawing conclusions based on their data. Also, in Unit 1, Concept 1, Lesson 4, the hands-on activity for forming carbohydrates allows students to develop and compare models of carbohydrates and amino acids to determine the function of biomolecules. Students build models with gumdrops, wooden toothpicks, and disposable plates. Students can select what each color gumdrop will represent and then how the structure and function of each molecule played a part in the design it had. The teacher can utilize the learning checks as assessments or use the questions outlined in the lesson plans.

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 or problem. For example, in Unit 1, Concept 1, Lesson 11, students are asked to

apply their learning from Unit 1 to a new situation with researchers who are designing a designer drug. Also, in unit 5, concept 3, lesson 11, students evaluate non-Mendelian genetics. Students review material before taking a concept check-in with new situations, such as “What other characteristics would have to be taken into account before a new formulation would be considered better than the original?." Another example is in Unit 5, Lesson 10: STEM Project Starter: Nondisjunction Dysfunction. The activity states, “Students will ask questions about the significance of meiosis in increasing diversity in populations and about interactions among systems in animals that perform various functions.” This leads to the following: “Students should compare and contrast the different syndromes that occur as a result of having too many or too few chromosomes. Students should determine what the effects are of each of the chromosomal abnormalities.”

- This can be seen throughout the Unit lessons, which all begin with engaging real-world phenomena that are revised and built upon regularly. For example, in Unit 1: The Chemistry of Life, the unit begins with the phenomena of The Hunt for Carbon on Mars, where students view a video where “Part of the Mars mission for rover Curiosity is to find carbon-based molecules” and ask students to ponder the question “Why would the discovery of organic carbon on Mars be so important?” Later in the unit, in Extension: STEM Project Starter: For Lack of an Enzyme, students ."..research a disease caused by an enzyme deficiency, including effects and treatments, and use research to write a report about the disease and its treatment.” where “The purpose of this project is to assess student understanding of the role of enzymes. Remind students that biochemical pathways have multiple steps and branches. Students should understand that enzyme deficiency has two potential problems: a substrate buildup and a lack of product.” Also, in Unit 5: Concept 1: Asexual and Sexual Reproduction, the unit begins Lesson 1 with the real-world phenomena of genetic variation in a litter of puppies and how “There is a wide variation among a litter of Staffordshire terrier puppies. What explains why offspring with the same parents are similar yet different?” Finally, in Unit 1, “Life’s Foundation” Concept 1: The Chemistry of Life - Lesson 9, students have to answer questions from the informational text, video, and images about a mutation that leads to the disruption of the sodium-potassium pump.
- The materials include assessments built into the lessons in a dedicated Evaluate section that addresses novel concepts. For example, in Concept 4: Genetic Engineering - Lesson 8: Evaluating Genetic Engineering, students are asked to review the main genetic engineering techniques and then take a summative assessment to review what they have retained from the concept. Also, in Unit 6: Ecology Concept 1: Nutrient Cycles Lesson 10, “Evaluating Nutrient Cycles,” students are asked to define their knowledge in a summative assessment. The materials allow the teacher to determine how students respond to applying what they have learned to specific questions that allow students to apply their knowledge to novel situations.

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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.	M
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

Meets | Score 2/2

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

Materials include information and/or resources that provide guidance for evaluating student responses. Materials support teachers' analysis of assessment data with 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 exemplar student responses that guide teachers in evaluating current student responses during class discussions. For example, teacher materials contain sample student responses for all discussion prompts that appear in both the student and teacher materials. For example, in Unit 4 Concept 2, Lesson 5, students "Describe the role of xylem and phloem in the transport of water and nutrients in plants." Teachers are guided to "Ask students how a plant may get the water and nutrients from the ground to other parts of the plant." Teachers are then guided to let students discuss and share; they are provided the exemplar response that "The root hairs take in water and nutrients from the soil, and the xylem distributes them from the roots to the leaves."
- The materials provide multiple assessment styles with answer keys within summative tasks to support teachers when evaluating student responses. For example, in Unit 5: Heredity, Concept 1 "Asexual and Sexual Reproduction," Concept Check-In: Asexual and Sexual Reproduction: Summative Assessment, the assessment tool contains a mixture of multiple choice, short constructed response, drag and drop, and multi-select questions that are TEKS aligned. Teacher guidance includes an answer key with correct answers and TEKS alignment for all multi-select, text entry, drag and drop, multiple choice questions, and sample student responses, with an Evaluation Criteria rubric for short constructed response questions. As another example, in

Lesson 5, “How is Genetic Engineering Applied to Agriculture,” the short answer responses have evaluation criteria to help teachers score their responses. In the first example, “Advantages of GMO Animals,” two points are given for the question, and the rubric provides recommendations for an answer worth two points, one point, and zero points for the teacher. There is an identification and explanation for each point value. Also, in Lesson 7, the Explore for “How Are Matter and Energy Conserved by Photosynthesis in the Carbon Cycle?” lesson has a sample student response for the short answer along with a rubric under the evaluation criteria. There is a sample completion level for each score from zero to two.

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 include assessment tools that yield data teachers can easily analyze and interpret. For example, each Concept Summative assessment provides detailed information about student progress and provides % mastery per standard.
- The materials provide detailed guidance on how to respond to each student’s individual learning needs in all areas of science, based on measures of student progress appropriate for the developmental level within the “Check for Understanding” section of the “Lesson Planning” document for each lesson. For example, in Concept 1, Lesson 7: How Are Matter and Energy Conserved by Photosynthesis in the Carbon Cycle? - Lesson Planning document, under “Checks for Understanding,” the teacher has access to the “Check for Understanding” section with the answers to the activities. There is also an “Approaching Learners Strategy” section that provides guidance to the teacher for students who struggled with the Check for Understanding activity. The section provides approaches to support students who do not understand where carbon comes from and where it moves in the carbon cycle. Another example is in Unit 6 Concept 1: Nutrient Cycles - Lesson 2, where the lesson planning tool provides guidance on assisting struggling learners where the materials state, “in particular focusing on how they provide evidence for how nitrogen and phosphorus cycle through an ecosystem. Lead students to interpret their findings in terms of how changes in these cycles affect the ecosystem." A final example is in Lesson 6: What Is the Structure and Function of the Cell Membrane? The teacher has the “Approaching Learners Strategy” for various questions in the Check for Understanding section to provide guidance on writing scientific explanations for students who struggle with the “Explain” questions prompt. The guidance reads, “To make this process easier for students, try explaining it to them as the following equation: Explanation = Claim + Evidence + Reasoning. This provides students a clearer path to write the explanation.”

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

- The information gathered from the assessment tools helps teachers when planning core science instruction. For example, summative assessments provide teachers with detailed views of performance by standard, by class, and by assessment. This can support teachers with taking appropriate actions to plan reteach or acceleration lessons. Also, in the lesson planning document in the Facilitating the Learning section in Unit 6 Ecology Concept 1: Nutrient Cycles - Lesson 2, the teachers are instructed to guide the students toward initial conclusions based on their data, in particular focusing on how they provide evidence for how nitrogen and

phosphorus cycle through an ecosystem. Teachers lead students to interpret their findings regarding how changes in these cycles affect the ecosystem.

- The information gathered from the assessment tools helps teachers when planning differentiated instruction. For example, throughout each lesson, students take multiple checks for understanding. Each lesson has a "Lesson Assessment Results'' section that allows a teacher to see how the students scored on the concepts for those lessons. These reports allow teachers to utilize data to help plan remediation, reteaching, or enrichment based on performance. The teacher has student and class views to help them build future lessons and modify the instruction appropriately for every learner. For example, when coupled with guidance in the lesson planning section (such as the guidance for reaching approaching learners in Unit 5, Concept 2, lesson 5 that, "Students who struggle to complete these items may need help interpreting where carbon comes from and where it goes during the carbon cycle. To emphasize that carbon is not created or destroyed, have students count the number of carbons on the products and reactants side of the photosynthesis and cellular respiration equation. Point out the number of carbons is equal on both sides of each equation,") teachers can respond to students' needs.
- The Concept Summative Assessments have a "Concept Assessments Results' page that reviews student progress by TEKS standard. These are shown in both a class performance and an individual student review. This allows teachers to plan their whole group instruction and create individual remediation for all students.

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

- The materials provide resources and teacher guidance on leveraging different activities to respond to student performance. For example, guidance is given on adjusting instruction in the Lesson Data Reflection Guidance and Concept Data Reflection Guidance documents. The documents include a search by TEKS for questions that students struggled with during the exam. The teacher is then guided to utilize additional resources for reteach or remediation for individual students or whole group instruction if the concepts need to be spiraled back into the lessons for the whole class. The materials provide resources and guidance on leveraging activities to respond to student data in the form of the advanced and struggling learning strategy in the lesson planning document. For example, Unit 2 Concept 1 Lesson 6 provides activities to assist struggling learners in reading a graph and advanced learners on the fluid mosaic model.
- Additionally, there are suggestions for teachers on how to “Take Action” and plan future core instruction for the whole class, or to individual student(s). These suggestions provide guidance to teachers on how to identify and utilize additional Discovery Education resources to supplement lessons for reteaching, remediation and enrichment. One suggestion provided is to use the global search in Discovery Education to search for a keyword or topic from the concept to find resources related to the concept. Another suggestion provided is to use the Browse by Standard option in Discovery Education to find resources aligned to the specific TX standard(s).
- The materials provide teacher guidance for responding to EB student differentiation needs.For example, in Unit 2 Concept 3, Lesson 6, teachers are provided with guidance to meet the needs of ELLs at various levels.

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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.

- 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. For example, in the Unit 2 Concept 1 concept check, students answer the question, “Prokaryotic and eukaryotic cells have similarities and differences. Place the tiles into the respective columns of the table to correctly identify components unique to prokaryotic and eukaryotic cells, as well as those shared.” Each definition is scientifically accurate.
- Assessment items are free from errors. For example, in the concept check for Unit 4 Concept 1, students look at a model of the chemical equation for photosynthesis. They then answer a question about how the model shows the conservation of matter during photosynthesis, which is aligned to TEKS B.11A. This selection is free from spelling and grammatical errors. Also, in Unit 2 Concept 1, the summative assessment contains 14 accurate and error-free items. Finally, Unit 3, Concept 2, Lesson 4 contains student Checks for Understanding that are accurate and error-free.
- 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 Unit 4: Plants, Lesson 3: Hands-On Lab: Photosynthesis, after students “Investigate how energy is transferred, and matter is conserved during photosynthesis.” teachers are guided to check for understanding via an analysis question, “How do the results relate to the reactions of photosynthesis?” Also, in Unit

7: Life's Diversity Concept 1: The History of Life on Earth, Concept Check In, Concept Summative includes questions such as "Which of the following statements concerning the origin of DNA is widely accepted by scientists?"

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

- Assessment tools use clear pictures and graphics. For example, in the concept check for Unit 2 Concept 1, students view two accurate images of different cells. They explain which one is eukaryotic and why. Both images are clear and concise. Also, in the concept check for Unit 4 Concept 1, students look at a diagram that shows matter cycling between a chloroplast and a mitochondrion. The diagram clearly shows a mitochondrion and chloroplast, allowing students to successfully answer questions. Also, in the materials for The Chemistry of Life, the assessment has a large image of a cell membrane that covers most of the screen with large labels that are easy to read.
- Assessments contain pictures and graphics that are simple to understand. For example, in Unit 4: Plants, Concept Summative, students are asked, "Most flowering plants have large, visible reproductive structures, which can be seen in the image below. (labeled image of angiosperm flower) Using the diagram, explain how the structures of a flower work together to perform reproduction."
- Assessment items are developmentally appropriate. For example, in the materials for The Chemistry of Life, the assessment has an image of amylase attaching to a starch molecule to become Maltose molecules. This image is both clear and developmentally appropriate for a high school classroom. In another example, in Unit 3 Concept 2, the concept check-in contains images of a cell membrane and beaker with dialysis tubing. The images are large, clear, and developmentally appropriate for a high school classroom.

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

- The materials include an assessment section in the Teacher's Guide that supports the teacher in understanding the types of informal assessment tools in the curriculum. It describes the types of assessments, where they are located, and how teachers can provide assessments through models, scientific explanations, hands-on activities, checks for understanding, and concept summative assessments. For example, teachers are provided with a distinct section in the Program Guide that supports the teacher in understanding the types of informal assessment tools included in the curriculum, such as formative and summative assessments and the accompanying rubrics. It also explains that rubrics include a checklist of required components to help guide students' thinking.
- The materials include detailed information supporting the teacher's understanding of assessment scoring procedures. For example, the program guide details the rationale behind including rubrics. It also explains that rubrics include a checklist of required components to help guide students' thinking.
- The materials include teacher descriptions of using the assessment tools to enhance learning. The teacher provided a process for students to follow for their scientific arguments. They have to craft an explanation by stating a claim, finding the evidence to support the claim from reputable sources, and describing the reason for their scientific argument. This process helps ensure students craft strong evidence and show an understanding of what they have shared.
- The materials provide guidance to ensure consistent and accurate administration of assessment tools by embedding assessments throughout lessons and providing reminders for teachers in

the lesson planning document for the checks for understanding. For example, in Unit 3, Concept 2, Lesson 7, the document says to “Remind them they may upload images, audio, and video files using the “attach file” option to communicate their scientific explanations or models.” and “To make this process easier for students, try explaining it to them as the following equation: Explanation = Claim + Evidence + Reasoning. This provides students with a clearer path to write the explanation.”

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. For example, materials provide support with text in informal assessments. In the core text, students and teachers can have text read aloud, highlight important information, and annotate content with sticky notes to allow for differentiation. This is explained in the Program Guide. Also, video clips use a closed-captioning feature to help all students see and hear scientific vocabulary in context. For example, in Unit 1, Concept 1, Lesson 1, students watch a video on the Mars Rover *Curiosity.* They can click CC on the video to see captions.
- The materials include tools for teachers to efficiently administer the assessment, such as changing the exam's language to English, Spanish, and Arabic. This accommodation supports Emerging Bilingual students. This can be seen in Unit 4: Plants, Concept Summative Assessment Settings and Materials.
- Assessments can randomize the question order and determine how many times the students can retake the assessment. Also, text-to-speech and a zoom feature are built into the assessment digital platform. These options allow the teacher to differentiate learning for multiple student populations.

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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 include guidance for scaffolding instruction and differentiating activities based on targeted areas in which students have not yet achieved mastery. In the lesson planning section, teachers are provided explicit guidance on using different approaches to reach learners. For example, the lesson provides ELPS Support Strategies and differentiation for beginner and intermediate proficiency levels in the Cell Cycle and Specialization Engage: Scope Phenomenon. This can be seen in the suggestions to use Total Physical Response movements or gestures to reinforce vocabulary connection activities, such as "Mitosis: start with hands clasped together in front of the body and then separate the hands into two fists." Also, in Unit 2, concept 1, there is a lesson titled, "What is the structure and function of the cell membrane?." In this lesson, students interpret an active transport graph. The teacher's guidance includes, "Students who struggle with the Transport Kinetics item may need help interpreting the graph in the prompt. Remind students that kinetics means motion and extracellular means outside of the cell." This guidance helps them address potential misconceptions.
- Lessons include recommendations for downward scaffolds to support students in successful science learning and knowledge building. For example, all student graphic organizers contain sample student responses to help the teacher provide support to students. For example, in unit 2, concept 1, lesson 2 ("Discovering Cell Structure and Function"), students complete a KWL chart about cell structure through the lens of the phenomenon of hibernation. Teachers are provided with sample student answers and evaluation criteria to support them in meeting students' needs. In another example, the Cell Cycle and Specialization Explore: Identifying the Cell Cycle provides teacher differentiation guidance through Tiered Intervention Strategies for

Tier 1, Tier 2, and Tier 3. This can be seen in the Tier 1 guidance: "Assign a partner to model participation and prompt the student to engage in the game." Similarly, in Unit 4 (Heredity), Concept 2 (DNA) Lesson 2, students are reminded about the role of enzymes in DNA replication. Then at the end of the lesson, students complete a drag-and-drop activity over the similarities and differences in DNA and RNA, then make a claim with supporting evidence about how DNA replicates itself.

- The Interactive Glossary provides support to all students and diverse learners alike. The vocabulary support and multimedia insertions allow students to utilize the feature to deepen their understanding of reading the words in context versus using an actual definition to scaffold the learning of scientific vocabulary.
- Students are asked at the end of the lessons to provide model revisions. Modeling activities can promote mastery in students struggling with content. For example, Concept 1: Cell Structure and Function - Lesson 3 Hands-on-Lab allows students to create models of prokaryotic and eukaryotic cells. Then they review their similarities and differences. Ultimately, they review their models and define any changes they would recommend for the future.

Materials provide enrichment activities for all levels of learners.

- Materials provide enrichment activities for all levels of learners. In each concept, the Elaborate section offers an extension of learning for all students through investigations into STEM careers. For example, in Unit 4 Plants, Concept 1, Lesson 9 ("Applying Photosynthesis"), students explain how technology can use the chemistry involved in photosynthesis to transfer energy and transform matter. In doing so, they read about the work of scientists to make real-world connections and build off and extend the core content of the unit, also for the STEM Projects in Concept 1: Cell Structure and Function in the Extension lesson. Students are asked to design and construct a cell membrane model. The advantages and limitations of the models are also explored to ensure students understand the concepts deeply and provide students with an opportunity to discuss the limitations of models in science.
- All units contain STEM project starters to extend the learning for all students. For example, in Unit 4, concept 1, students can engage in a STEM project called "Modeling Carbon Storage through Photosynthesis." In this activity, students act as scientists to model how photosynthesis stores carbon. Another example is the STEM Project Starter: Viral Medicine lesson, which allows students to explore how we can utilize the virus machinery in biotechnology and create an educational resource on viruses with the knowledge they have learned in the unit. Finally, in Unit 1 (Life), Concept 1 Chemistry STEM project, students research a disease caused by an enzyme deficiency, including effects and treatments, and use their research to write a report about the disease and its treatment.
- The materials provide enrichment activities that account for learner variability. Teacher guidance and additional resources encourage exploring and applying course-level science knowledge and skills in various ways, including applying new learning to project-based explorations. For example, in scope Cell Cycle and Specialization Explore: Identifying the Cell Cycle includes Advanced Strategies ``Challenge students to figure out a sentence related to the current topic when presented with the first letter of each word. For example, write T.n.h.t.c. on the board. (Answer: The nucleus houses the chromosomes.)"
- The material suggests small group or partner discussions. This can be seen in the Diseases Explore: Outbreak! Lesson. After conducting the lab where students replicate the spread of infectious disease, teachers are guided to "as a class, debrief students using this questioning strategy: Think-Pair-Share."

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

- The lessons include recommendations for just-in-time scaffolds to develop productive perseverance in learning. For example, materials include questions for the teacher to support students when they struggle to maintain engagement. This can be seen in the Cell Cycle and Speciation, Explore: Cell Specialization Game. In the activity directions, teachers are guided to ask questions such as: 'True/False: 'Differentiation is when an unspecialized cell becomes more specialized, like a nerve or brain cell.' "Throughout the game, the teacher is guided to "Explain what each group represents. Remind them that this all happened by turning some genes on and some genes off." Another example is in Unit 3 (Animals), Concept 1, Lesson 7 (What are the key components and functions of the reproductive system?). Students read about the reproductive system and answer a high-level check for understanding. Teachers are prompted to ask, "What are the main hormones involved with the reproductive system?" and given the correct answer to supporting students, engaging in a higher level discussion about "how the endocrine system regulates the many processes of the reproductive system." Finally, in Concept 4 (Viruses), Lesson 2: Exploring Viruses, the activity allows students to utilize a model to build a virus and check to see if they have all the components to make it work effectively. The teacher models this process, and then students can practice independently.
- The lessons provide support and resources for students ready to accelerate their learning. The materials include enrichment activities that contain challenging activities and assignments that extend beyond the regular curriculum and stimulate critical thinking, problem-solving, and creativity based on the achievement of students' grade-level mastery of scientific knowledge and skills. This can be seen in the activity Cell Cycle and Specialization, Acceleration: STEM Choice Board which can be assigned digitally to specific students based on achievement. Teachers are guided to "Instruct students to choose one or more activities on the Choice Board, listed below:" Another example of this is in Unit 2 (Cells), Concept 1, "Cell Structure and Function" Lesson 8: Elaborate where, after students read the CIT section, advanced students are encouraged to research at least one discovery that bioengineers or molecular biologists have made recently.
- In the caregiver guide, each unit has a home connection to extend learning beyond the classroom. For example, for unit 3, parents are guided with the statement, "With your child, explore the Decoding Cancer resources, developed by the Val Skinner Foundation, Discovery Education, and Rutgers Cancer Institute of New Jersey at https://www.decodingcancer.org/. There are family discussion guidelines that help you provide your teen with information about breast cancer treatment." This helps all students and their parents to have access to just-in-time acceleration.

Discovery Education Science Techbook for Texas 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.

- Materials engage students in the mastery of the content through various instructional approaches, which include opportunities for students to engage in inquiry-based learning activities through the 5E instructional model. For example, in Cell Cycle and Specialization: Identifying the Cell Cycle, we see the Explain (to build background knowledge) before students elaborate with options for science, engineering, math, reading, writing, and science today connections. Also, in Unit 5, Ecology Concept 1 Nutrient Cycles Lesson 3: Explore, students are shown a picture of exhaust in a city and asked about breathing polluted air. Students then go through a nitrogen cycle simulation to identify various parts of the cycle. After students explain their understanding by creating a model to show nitrogen flow. A final example can be seen in Unit 5 (Heredity), Concept 5: Genetic Disorders, Lesson 2: Explore. In this lesson, students look at Down syndrome to determine how DNA is responsible for these physical attributes. During the lesson, the students conduct a mutation, gather and display evidence, make predictions, and complete a matching and multiple choice question.

- Materials also engage students in mastery of the content through accessing prior knowledge and/or allowing them to share their prior experiences at the beginning of the lesson before heading into the lesson objectives. For example, in unit 6, concept 2, lesson 4 ("Modeling the Carbon Cycle), students access prior knowledge twice--first to make a connection between vegetables they eat and the greenhouse effect and then to remember what they know about the carbon cycle. This allows them to make connections when modeling the carbon cycle by building a terrarium. This can also be seen in the lesson "Plant Structures, Teacher Background, and Science Outside the Classroom," which guides teachers to "help students practice and learn more about Plant Structures, use the Make a Flower activity."
- Materials also provide progressive instructional approaches in the lab investigations to promote students' mastery of content. For example, in Concept 1: The Chemistry of Life. In this lesson, the students investigate enzyme activity in digestion. They begin by creating their prediction for what will happen in the lab. They can work with a partner or a small group to complete the lab investigation. Finally, they have an understanding check they complete individually to ensure they learned all the concepts from the lab.

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

- The materials support a variety of instructional groupings (e.g., whole group, small group, partners, one-on-one). For example, in Unit 2, Concept 2, Lesson 4, students can engage in a lab activity (building a terrarium to model the carbon cycle) in either partners or groups. They then answer application questions to cement their learning individually. Another example is in the lesson: Plant Structures: Elaborate: Science Connection, teachers are guided to "Allow students to work in small groups" to "...create commercials to creatively inform the community about plants as the best source of food on Earth." Finally, in Concept 1, Lesson 4, students work individually and then work with a partner or group for the lab investigation.
- The materials guide teachers on when to use specific grouping structures to increase student knowledge. For example, the program guide details the different types of grouping structures teachers can use--from whole group to partner to a group conversation. The program details how students can engage in sense-making via conversation and provides teachers with guidance (e.g., specific question stems) to increase student thinking across grouping structures. Another example is in the Plant Structures: Elaborate: Engineering Connection resource, where the teacher's guidance states, "determine if you want students to complete this engineering challenge individually or in groups."
- The materials consistently support flexible grouping by providing teachers with a digital assign button for an entire lesson or specific activities. Additional depth or shorter, targeted assignments can be provided to students quickly by the instructor as needed.

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

- The materials provide multiple types of practices for students (e.g., modeled, guided, collaborative independent). For example, students engage in learning across lesson types, including with teacher guidance, independent practice, and pair/group practice. Another example is in Unit 7, Concept 1. Here, students read independently, answer comprehension questions via discussion with the teacher, explore the nitrogen cycle with a partner, and independently create a flow chart of the nitrogen cycle before discussing it with a partner or group across just the first three lessons. This can also be seen in the Plant Structures: Elaborate:

Engineering Connection lesson, where "students will focus on the first five steps of the Engineering Design Process (defining the problem, brainstorming, planning, building, and testing) to build a hydroponic growing system using minimal materials that could be found in most homes and are easy to come by." Also, in Concept 4: Viruses, Lesson 3, students must create a model of viral outbreaks using the concepts they learned in the unit. Students then work independently to explain the structure and function of viruses in Lesson 7 (Explaining Viruses).

- The materials provide teacher guidance and structures for the effective implementation of multiple types of practices. For example, each lesson contains a lesson planning section that states a clear purpose, learning goals for the group, and independent practice activities in units and lessons. For example, in Unit 5, concept 2, lesson 2 ("Identifying Feeding Relationships in Ecosystems," lesson guidance states that, "By the end of the lesson, students will be able to: Analyze how disruption to feeding relationships in an ecosystem affect the cycling of matter, flow of energy, and stability of an ecosystem." All activities are then aligned to this objective, including the formative assessment at the end of the lesson.
- The materials recommend frequent and varied assessments of learning to ensure that multiple types of practices lead to student mastery. For example, in the Prokaryotic and Eukaryotic Cells: Evaluate activity, teachers are provided with options for a Claim-Evidence-Reasoning in which students demonstrate mastery by "construct(ing) and support(ing) an argument that endosymbiotic theory is a viable theory." or via the scope assessment in which "students will be assessed on the knowledge gained after completing the activities in the Engage, Explore, Explain, and Elaborate sections of the scope."
- Materials achieve effective implementation through lab procedures that allow the students to complete a lab independently if needed but then give instructions to share data with a partner or group. For example, in Unit 5 (Heredity), Concept 1: "Asexual and Sexual Reproduction," Lesson 4: Explore, students observe asexual reproduction in yeast, and the instructions prompt students to communicate their observations before proceeding.

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

- Materials represent diverse communities using images and information that are respectful and inclusive. For example, in Unit 2, Concept 1, Lesson 9 (Applying Photosynthesis), students watch a video that shows images of diverse types of ecosystems and includes interviews with scientists in a lab in China studying how plants use photosynthesis. This can also be seen in Biomolecules: Engage Scope Phenomenon, where students " view an image of planets beyond the Solar System and a table that shows the percentage of elements in living organisms compared to the percentage of elements of the nonliving world."
- Real-world examples and connections throughout the materials represent diverse communities and places, including rural, urban, and suburban communities, cities, and states across the U.S. and worldwide. For example, in Unit 2, Concept 4, Lesson 8 (Applying Viruses), students watch a video about viruses in gene therapy. The video shows multiple images of doctors and scientists from diverse backgrounds. The lesson also uses inclusive language (e.g., referring to scientists by type, such as molecular biologists, and always using gender-inclusive language).
- The materials represent a diversity of ethnicities in the images and information about people and places. In Unit 4 (Heredity), Concept 4: Genetic Engineering Extension - STEM project, there is a video with a Caucasian female scientist being interviewed. In Unit 3 (Plants), Concept 1: Photosynthesis Lesson 9 - STEM project, there is a video with a male Asian scientist being interviewed. In Concept 1: The Chemistry of Life, Lesson 1, there is an image of two people of

color exercising together. In Lesson 2, there is an image of a black hand checking the pH of a substance. In Lesson 4, there is a student of color modeling the activity.

Discovery Education Science Techbook for Texas Biology

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.

- Materials include teacher guidance for communication with EB students, intending to create comprehensible input. For example, in Unit 2, Concept 1, Lesson 4, What Are the Differences between Prokaryotic and Eukaryotic Cells?, teachers are provided with instructional strategies to support English language learners in discussing the cell types, the guidance suggests that teachers increase the wait time and allow for partner conversation to allow for processing and production when requiring a written or spoken response. Also, in Unit 2, Concept 2, Lesson 3 Hands-On Activity: Investigating Genetic and Environmental Influences, students are asked to predict how genetic and environmental factors affect twins. Teachers are provided with an exemplary response and targeted support for ELLs at each proficiency level. For example, teachers are provided multiple examples for supporting beginning ELL students; two examples are to "Provide students with a word bank of traits to use in their T-Charts and check for understanding of each word" or "Provide students with a summary of the most important parts of the text. Read the summary with students and check for understanding." For advanced students, teachers are guided to "Check for understanding of the words fraternal, identical, nature, and nurture," among other strategies. Multiple strategies are also provided for intermediate and advanced high students. Also, in Unit 6: Ecology, Concept 2: Ecosystems, Lesson 4: "Hands-On Modeling Energy Flow With An Ecosystem," when giving directions to a student at the intermediate level of English language proficiency, materials provide directions in the Lesson Planning document to "Ensure students understand the key vocabulary used in the

lesson, including ecosystem, trophic level, producer, primary consumer, secondary consumer, and tertiary consumer. Ensure that they understand what it means to make a model. Encourage students to use the appropriate vocabulary when speaking with their peers. Encourage students to seek clarification. Then, have students work with their partner to complete the activity."

- The teacher's guide embeds scaffolds into lessons for emergent bilingual (EB) students, such as visuals, gestures, sentence stems, graphic organizers, anchor charts, and manipulatives. Materials include an ELPs support table in the Teacher Preparation: Lesson Planning resource that demonstrates ELPS connections by referencing the language of the ELPS and how the lesson supports any given ELPS, broken down by proficiency standards. This can be seen in Unit 6: Ecology, Concept 1: Nutrient Cycles, Lesson 4: Hands-On Activity: "Modeling the Carbon Cycle," which contains ELPS supports for the different proficiency standards such as "Provide repeated exposure to new academic language to help students comprehend vocabulary words from the lesson (terrarium, photosynthesis). Allow students to work with peers to confirm their understanding by labeling the materials in the lab activity and discussing the setup for the terrarium. Students may need additional context and linguistic support, such as simplified language, to complete the lab tasks in sequence. "Also, in the Hands-On Lab: "Analyzing Evidence for Common Ancestry," the teacher has a tab in the lesson plan called "Facilitating the Learning," which provides textual support for what students should be able to do at each linguistic proficiency level. Another example is in Unit 4, Heredity Concept 1: "Asexual and Sexual Reproduction" Lesson 1, where the guide provides sentence stems and tips to remember the difference between asexual and sexual reproduction.
- The materials include guidance for linguistic accommodations through the Biology ELPS document, which outlines activities aligned with the ELPS standards. For example, standard 1A outlines 7 locations in the material in which ELPs are addressed specifically. For example, in Unit 7: Life's Diversity, Concept 2 Evolution, Lesson 5, the opening paragraph is combined with discussion questions, allowing the students to use prior knowledge to understand meaning in English.

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

- Materials use various online content to encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English. For example, content can be translated into nearly 90 additional languages and include links to resources for support in first languages via the Core Interactive Text feature and Chromebook extensions.
- Additionally, materials include an interactive glossary that contains definitions, images, and examples of word roots to help support EB language acquisition which contains access to hyperlinked videos that contain definitions, context, examples, and root meaning for all scientific terms. For example, when the word "biodiversity" is looked up in the glossary, the definition "the variety of species that exist in an environment," key context, "A tropical rainforest is an area of high biodiversity." etymology "Greek root bio meaning "life; Latin root diversitas meaning "difference," image of an "Open Ocean Free-Swimming Animals," "Change and Biodiversity" video, and animation are available to view. Point-of-use differentiation strategies in the teacher materials provide suggestions on how to use the program to maximize student learning. For example, the lesson three planning document of Unit 2 Cells suggests, "Ask students to respond to questions using prior experiences, encourage them to provide increasing detail using specific vocabulary presented in the lesson (e.g., What are example traits and behaviors? and What environmental experiences might affect these?)." The materials

encourage one-on-one or small group interactions to build linguistic acquisition and vocabulary development. The program guide explains how teachers can use purposeful groups to help support language acquisition.

Discovery Education Science Techbook for Texas Biology

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.

- Materials provide a Caregiver Course Overview for students and caregivers about the design of the program. It contains programmatic components and a high-level overview of each unit, including concepts, vocabulary, and phenomena). The program design is mapped out for each unit with Unit Concepts, Key Vocabulary, Unit Phenomenon, and Home Connections, where extension activities are provided that caregivers and students can engage in together.
- The Unit Phenomenon component helps caregivers understand how students anchor their learning in observable natural phenomena. For example, the Caregiver Course Overview shows how anchoring learning in phenomena and problems encourages students to become better critical thinkers and problem solvers. Also, the “Heredity” Unit Phenomenon states, “Asexual and Sexual Reproduction: Students are presented with the fact that puppies in a litter look different and yet similar because of the genetics of reproduction.” In addition, in the Ecology section of the overview, the text relates natural matter cycles with students recycling. This shows parents the design of the program links real-world issues with the concepts being taught. Finally, in Unit 1: Life’s Foundations, the roles of enzymes are explored and include developing models of carbohydrates. The home connection to the phenomenon asks students/families to identify someone they know that is lactose intolerant. It then asks the child to investigate the h types of enzymes in the body that support the breakdown of lactose and how probiotics may help a body’s system to digest lactose.
- The materials provide information to be shared with students and caregivers about the design of the program through the student letter from the Science Techbook Team. The letter mentions the layout items and what students will do in the program, such as images, videos, hands-on

activities, digital tools, reading passages, animations, and virtual labs. The letter mentions, "These resources will help you make observations, analyze, and interpret data to figure out real-world phenomena. You will solve problems, connect science with the world around you, and explore your questions about science.
- Materials provide translation resources for students and caregivers. For example, all student resources can be translated into over 90 languages via an easy-to-use browser extension.

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

- Materials provide at-home activities for caregivers to help reinforce student learning and development. For example, in the Caregiver Course Overview, there is an easy-to-understand set of home connections to share extension activities caregivers and students can engage in together, provided for each unit. For example, in the Caregivers Course Overview unit for Heredity, the Home Connections state, "Phenomenon in the Home: With your child, explore the Decoding Cancer resources, developed by the Val Skinner Foundation, Discovery Education and Rutgers Cancer Institute of New Jersey at https://www.decodingcancer.org/. There are family discussion guidelines that help you provide your teen with information about breast cancer treatment." Also, in the Home Connections activity for the unit "Life's Diversity," a recommendation is provided for parents to find their local historical society and see about fossils found in their area. In another example, in the unit "Animals," the Home Connection asks the family, "with your child, take a trip to a local historical society that maintains fossils from your local region. When visiting the center, discuss how changes in the landforms in the regions may have impacted the location and types of fossils found in the area."
- Materials provide online resources and strategies for caregivers to help reinforce student learning and development. For example, in the Caregiver Course Overview, caregivers are told about student access to the online Discovery education platform. The overview states, "Your student can sign in anytime to engage with exciting digital activities and resources across a variety of subjects, grades, and topics of interest." This makes it easy for caregivers to support at-home learning. Also, in the unit "Animals," the Home Connection asks the family to locate reliable sources from the Internet describing how the body systems learn to adapt through training and discuss similarities in how body systems allow people to explore places with these extreme conditions.
- Materials provide virtual interactive activities for caregivers and students to help reinforce student learning and development. For example, the Ecology unit section in The Caregiver Course Overview Biology shows a video link for parents to go on a virtual field trip to "investigate the tundra and discover the independence of organisms and nonliving factors on the habitat of polar bears, using the Discovery Education Polar Bear Tundra Virtual field trip found at https://www.discoveryeducation.com/learn/tundra-connections/#watch-now. Experience with Polar Bears allows your family to hear from scientists working in the field with the polar bears and discuss their observations of changing conditions that impact the organisms in the ecosystem." This allows caregivers to work closely with students to ensure they are learning the content and show how important their scientific studies are as well. This helps reinforce the importance of learning science when both the caregiver and teacher make scientific learning a priority.

Discovery Education Science Techbook for Texas Biology

Materials include information to guide teacher communications with caregivers.

- The materials include explicit teacher guidance for communications with caregivers. The Caregiver Course Overview is intentionally designed to position caregivers as partners in the learning cycle in the classroom. Information to help teachers appropriately engage caregivers, documents that describe how and when teachers can use the various components of the course overview documents with caregivers. The guide reads, “To engage caregivers at the beginning of the year, email or print the following Caregiver Course Overview to provide an overview of the unit learning goals, as well as opportunities for caregivers to connect to student learning at home.” The guide then provides screenshots that provide teachers with caregiver guidance on how to assess students grades, look at the assignments that are upcoming or due, and how parents can access scoring information for each assessment.
- Additionally, the Discovery Education “Help Center” provides educators, caregivers, and students a variety of support resources, including the Discovery Education Family Resource page, that provide resources for caregivers to use with their students at home to supplement learning. For example, the page guides caregivers to the DE originals channel, which provides videos that help caregivers to engage students into learning at home, such as the “DEmystified channel. For example, the “DEmystified: Ecosystem” investigates ecosystems and how they can help us understand the complex connections between plants, animals, and their environments through an interesting 4 minute video. Additionally, within the “Help Center” there is specific instructions to guide caregivers in certain tasks, such as; how to log into Discovery Ed, access the science techbook, navigate the course and techbook, and other tools such as highlighting and accessing glossary. All instructions are provided with helpful videos.

Discovery Education Science Techbook for Texas Biology

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.

- Materials are accompanied by TEKS-aligned scope and sequence located under the course materials tab outlining the series of chapters, the unit it belongs to, and all knowledge and skills. For example, in the unit Life's Foundations, the teacher can find TEKS 1.A-F, 3A-C, 5.A, and 11.AB are all covered within this unit. For a further look into the standards, materials are furnished with a comprehensive TEKS alignment tool within the ancillary components, which show embedded standards within the curriculum; this allows teachers to delve into each TEK and discover all corresponding lessons, units, and resources, enhancing the process of lesson planning.
- A detailed table of contents is included in the materials. Each overview outlines the TEKS and ELPS covered, the duration of lesson components within the unit, extension activities, and concept check-ins, thereby enriching the teaching and learning process.
- Every book chapter provides a Teacher Overview component, listing all relevant TEKS standards and highlighting the progression of knowledge and skills embedded within Additional Materials and Resources and the subsection Lesson Planning, such as demonstrated in Unit 1: Life's Foundations, Concept 1. This component displays the objectives and associated TEKS standards for the concept of The Chemistry of Life.

Discovery Education Science Techbook for Texas Biology

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

- The materials are within a 5E framework, which helps build authentic connections to science and engineering practices where students ask questions, conduct investigations, analyze data to develop explanations, and recognize the importance of scientific research. For example, materials guide teachers on specific types of questions that can prompt these connections in every lesson, such as in Unit 1 correlating the cell cycle with wound healing, a link to SEP B.1A. The materials also include a real-world phenomenon for each unit to facilitate student-made connections across core concepts. For example, in Unit 2, Lesson 1, the materials present hibernation phenomena in some mammals and connect this to the concepts of the structure and function of cells.
- In addition, the materials provide supplementary teacher resources like overviews and videos to guide student comprehension of the concepts and the application of engineering practices. As seen in activities where students use engineering principles to build models, such as in the extension activity, STEM project starter: Waves through the Digestive Tract, in Unit 3, the digestive system demonstrates peristalsis or the process of carbon storage in photosynthesis.

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

- Each lesson provides a Setting the Purpose section, assisting teachers in facilitating connections to prior knowledge and provoking student engagement through relevant questions. For instance, unit 6, Lesson 4 uses this section to contextualize the carbon cycle, where the materials spiral in photosynthesis and cellular respiration.
- Throughout the year, the curriculum offers a diversity of spiraled activities enabling review, practice, and assessment of student knowledge and skills, thereby supporting mastery and retention. An example of this is found in Unit 5: Heredity, Lesson 6: What are the differences between Mitosis and Meiosis, where the idea of mitosis and DNA replication is reintroduced, as well as sexual and asexual reproduction.
- To gauge mastery and retention, unit concepts are followed by Concept Check-In summative assessments. For instance, questions on understanding viruses are given at the end of Concept 4 of Unit 2, and those on biological systems' interactions at the end of Unit 3, Concept 1. Furthermore, Teachers are given opportunities to assign activities to students that spiral science and engineering practices, fostering a continuous review and practice of knowledge and skills to promote mastery and retention.

Discovery Education Science Techbook for Texas Biology

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 encompass a comprehensive program guide that offers an overview of course content, sequence, lesson structures, and embedded supports in digital materials, including text support features. The guide details best practices for facilitating various lesson types and strategies for differentiation. It also outlines the structure and components of the Discovery Education Techbook, such as the 5E lesson model, phenomena-based teaching, and digital teaching resources.
- The materials provide teacher overview documents for each unit and lesson. These assist teachers in using the materials by listing the included resources, necessary hands-on activity materials, preparation tips, and suggested pacing. It further supports comprehension and usability through structured guidance on facilitating learning and checking for understanding.
- Each lesson comes with planning support, guiding teachers on how to meet the needs of learners at different proficiency levels. The planning section outlines facilitation strategies for diverse groups, like Emergent Bilingual students, and includes specific examples from various units. These documents provide information on lesson objectives, alignment with TEKS

standards, lesson purpose, facilitation directions, and methods for checking for understanding. The planning materials are designed for simplicity and ease of use to accommodate all learners. Teachers are encouraged to employ research-based instructional strategies such as the jigsaw approach and the Think-Pair-Share activity. These strategies foster interactive learning and are embedded in various lessons, as seen in the Viral Medicine Project and the Evaluating the Chemistry of Life lesson.

- Lessons are structured using cards with overview cards at the beginning. The planning guide on each card instructs teachers on facilitating the learning process, establishing the lesson's purpose, and explaining the associated real-world phenomena.

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

- Each unit includes a unit overview that aligns the TEKS to each lesson, allowing teachers to identify when and where each standard is taught quickly.
- The teacher overview within each unit provides information such as real-world phenomena, concept objectives, essential vocabulary, and relevant standards, highlighting the connection between biology and the natural world (e.g., hibernation in Unit 1).
- The materials include cross-content standards for English 1 and Algebra 1 in an alignment chart with course materials, and they include embedded tools like calculators. These tools, in conjunction with the alignment chart, support the ability to make interdisciplinary connections. For example, English 1 standard E1.1.D is included in every Explain lesson.
- The curriculum's table of contents features TEKS correlations as well as the alignment chart for math and ELA standards.
- While the unit-at-a-glance teacher documents include the TEKS for the unit, and they incorporate cross-content correlations for ELA and Math. For instance, the beginning of Unit 1, Concept 1, Teacher's Overview, includes a real-world phenomenon, concept objectives, key vocabulary, and TEKS standards specific to the unit but needs cross-content standards from other subjects.
- The scope and sequence document, accessible under Course Resources, includes all standards within the unit, encompassing science and engineering practices, recurring themes and concepts, academic standards, and English Language Proficiency standards but does not include cross-content standards.

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

- Within each lesson, comprehensive lists of necessary materials are provided for students and teachers to conduct the activities, including hands-on labs. Specific materials for each lab are found in the lesson planning document, encompassing all equipment and supplies needed to implement the instructional activities. For instance, Lesson 3 in Unit 1 includes both student and teacher-facing materials, while the Engage Lesson of Unit 4, Concept 2, Lesson 3 presents a thorough list for the Hands-On Lab: Photosynthesis.
- Practical examples of the materials listed for lab investigations are varied and can include items such as distilled water, eye dropper, flask, 1% bile salt solution, hot plate, pipette, forceps, light microscope, Elodea leaf, coverslip, and Bunsen burner, among others. These items are typically listed at the beginning of the assignments in the Explore section of the lesson.

Discovery Education Science Techbook for Texas Biology

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

- The materials incorporate safety guidance with a list of precautions specific to each lab, present in both teacher and student views. These safety precautions follow the materials required for each hands-on lab activity.
- The teacher resources include a list of grade-appropriate lab supplies for each experiment. The hands-on lab sections include detailed safety precautions such as referencing classroom safety rules, dealing with accidents like broken glass, maintaining proper attire, and adhering to safe lab practices like not eating or drinking. For example, in Unit 3, Lesson 3, and Unit 4, Concept 1, Lesson 3, there is essential guidance for handling slides or using microscopes and safety precautions for chemicals and lab equipment use.
- In addition to the above, the materials include a comprehensive student safety letter covering aspects of lab dress, accident handling, and best practices for safety behavior.

Discovery Education Science Techbook for Texas Biology

Indicator 8.3

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

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

Meets | Score 2/2

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

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

Evidence includes but is not limited to:

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

- The lesson activities are appropriately paced and provide timing for each activity within the lesson. For example, Unit 2, Concept 1, Lesson 5 suggests 45 minutes for the lesson, “What is the role of mitochondria in eukaryotic cells?” There is a time breakdown for each component of the lesson, which provides scheduling considerations.
- Lessons are based on 45- or 90-minute classes that enable them to work for both regular and block classes. The lessons have an overall time frame, but they also include a breakdown of the time to complete each section of the lesson to help teachers plan accordingly. Teachers who choose to remove or alter a portion of the lesson can adjust the time frame accordingly with the breakdown of lesson times listed with the title of each section. For example, in the teacher textbook Unit 6, Concept 1 has a total of 12 lessons, each 45 minutes in length.

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

- The materials guide strategic implementation without disrupting the sequence of content that must be taught in a specific order following a developmental progression. For example, SEPs, such as asking questions and defining problems, are introduced before planning and carrying out investigations and are embedded throughout each unit. The materials clearly delineate the order of units to ensure students learn about precursor concepts first. For example, the scope and sequence start the school year curriculum with a micro approach with cells and continues to progress to end the year with a macro view of biology in Unit 7: Life's Diversity.

- Additionally, in the scope and sequence, the teacher's guidance shows that 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 which follows an appropriate developmental progression.

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

- Materials for the course are flexible and can be completed within one school year. The Science Techbook for Texas Biology is designed to be completed in one 180-day school year. The course includes two pathways, Comprehensive and Express, to support teachers in adapting the curriculum based on their local availability of instructional time. The Comprehensive Pathway, found in the Table of Contents, includes the full set of TEKS-aligned 5E lessons, including extension lessons, found in Elaborate. The Express Pathway is tailored to support flexible pacing within the school year. This pathway indicates key Explore lessons for each concept, selected by content and lesson type, to provide optionality for instructional delivery of core content by having scholars complete additional lessons at home. For example, in Unit 2, “Cell Structures and Functions,” lessons 4 & 5 are both indicated to be additional literacy lessons that can be completed at home to accommodate districts with a shorter school year. Additionally, in lesson 6, the materials suggest that the literacy activity, under the explore tab, can be completed at home.

Discovery Education Science Techbook for Texas Biology

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.

- The digital materials include appropriate white space and an overall design that does not distract from student learning. For example, student materials are appropriately designed to support student learning. Student materials include the following: a clear objective, reading material, directions, and space for capturing answers.
- The teacher guidance materials are appropriately designed with clear, designated places for important information. Teacher guidance materials include teacher's guides designed so teachers can locate important information easily for planning and implementation. Each lesson has a lesson planning section with guides for facilitating the learning.
- The student materials include appropriate white space and a streamlined design to not distract from learning. Student materials are appropriately designed to support student learning. Student textbook materials include a clear main subject, topic, or purpose; titles and headings are prominent and clear; sections are clearly marked with subheadings; content is organized in a logical progression; and ancillary student materials, such as glossaries and tools, are easy to find and/or access. For example, the materials for Lesson 5 showcase high school students sharing a pizza at someone's home. In the background, there is a plant, window, and bike attached to the wall. The students are smiling and eating together. All graphics and text are easily visible and do not distract from learning.
- The materials include appropriate white space, and the design is streamlined to not distract from student learning. For example, in Lesson 4, Hands-On Activity: Forming Carbohydrates, the materials have appropriate titles in green, dividing the differing sections. A green header with a light gray background marks each section. The titles of each section are also listed on the left so teachers and students can easily click to go to the appropriate section without the section

headers distracting from the text itself because they are in a sidebar. The text has spacing between the headers and around two inches on the sides that might adjust depending on the monitor size for students using the product online. This layout is not a distraction and is clean looking.

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

- The materials embed age-appropriate images that support student learning and engagement without being visually distracting. For example, student activities include images appropriate to the text. Some of these include images of sequoias and duckweed, which are plants that students may see in the areas and places they visit. These can also be seen throughout the curriculum materials in the unit student view.
- The materials include age-appropriate multimedia that support student learning and engagement. For example, a video is embedded in a lesson on how species interact via feeding relationships so that students can get additional information. Also, there is a video of the digestive process in Concept 1: Interactions of Biological Systems - Lesson 5: "What Are the Parts and Functions of the Digestive System?" The video graphics work seamlessly, and the concepts are easier to understand with a video of how the full process works for salivary enzymes. This video makes learning more accessible.
- The materials include age-appropriate pictures for the students to view. For example, in Lesson 4, Explore Hands-On Activity: "Forming Carbohydrates," a student of color is pictured that would be the same age as a high school student. The student is performing the lab activity included in the text to build molecule models.

Materials include digital components that are free of technical errors.

- The materials include digital components that are free of any technical errors, such as inaccurate content materials or information and wrong answer sheets to problems. For example, in Lesson 4, Explore Hands-On Activity: Forming Carbohydrates, the text showcases a digital drawing of glucose that appears almost lifelike with the angles and shading. It seems more similar to an actual glucose molecule than a simple flat drawing because of the shading. The materials are free from errors, and the quiz for this lesson works seamlessly.
- The materials include digital components that function correctly and smoothly. For example, in Concept 1: Interactions of Biological Systems - Lesson 5: What Are the Parts and Functions of the Digestive System? many digital components showcase digestive system components that work easily when clicked. There was also a matching question in the Check for Understanding section that worked easily as well. Also, in Unit 4 Concept 2 Plant Form and Function - Lesson 1, student texts, evaluation criteria, and graphic organizer templates function correctly and open properly.

Discovery Education Science Techbook for Texas 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.

- Student digital components include embedded tools that support learning. For example, the glossary contains a definition, video, and images that a student can easily toggle between to better understand the term “autosomal recessive disorder.” Students can also take notes in the digital notebook or use the text-to-speech or highlighter feature tool. Also, tools like a calculator, graphing calculator, scientific calculator, unit converter, and whiteboard are important for supporting student learning.
- The embedded technology within materials supports the print materials instead of replacing them. For example, in Unit 1, Concept 1, Lesson 1 (Discovering the Chemistry of Life), students read about carbon-based life forms and how the Mars Rover *Curiosity* looks for them. Students then can watch an embedded video to see the rover but still must read the text to engage with the lesson’s core idea.
- The materials’ digital technology resources and tools enhance student learning through such features as virtual labs, interactives, simulations, science connections, and online assessments. Teacher guidance includes suggestions for time and pacing and ways to assist students with making observations, asking questions, collecting data, and participating in discussions. This can be seen in Unit 1: The Chemistry of Life, Concept 1: The Chemistry of Life, Lesson 2: Hands-on Lab: Effect of Temperature and pH on Enzymes, as well as Unit 2: Cells, Concept 1: Cell Structure and Function- Lesson 2; Hands-On Lab: Classifying Prokaryotic and Eukaryotic Cells Lesson

Planning document. Also, in Lesson 7, Explore, What Are the Characteristics of Carbohydrates, Lipids, Proteins, and Nucleic Acids? The materials showcase a four-minute video on carbohydrates, allowing students to view their shapes and what elements form the molecules. This digital tool gives students a real-life visual to improve learning and engagement.

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

- The materials provide interactive simulations and models for students to explore scientific and engineering practices in a virtual environment. For example, in Unit 5, Concept 3, Lesson 2, students learn about predicting crosses with Punnett Squares. After students engage with text and images to understand the key concepts, they launch a digital tool in which they can play with different variables to model monohybrid and dihybrid squares; this allows them to have additional practice with the lesson objective. Also, in Unit 2: Cells, Concept 1, Elaborate: STEM Project Starter, students "Employ everyday materials to design and construct a model of a cell membrane that relates the functions of biomolecules, including carbohydrates, lipids, and proteins, to cell structure and function." In another example, in Unit 2: Cells, Concept 2, Lesson 4: Hands-On Lab: Identifying Stages of Mitosis, students "Investigate and identify the stages of the cell cycle in onion root tip cells." Finally, in Lesson 4, an interactive Lymphoid System Activity online takes students through the basics of the lymphatic system and the components that complete the system. They show pathogens and how they impact the immune system in relation to the lymphatic system. The activities are visually appealing and more engaging than simply reading text.
- The materials provide opportunities for students to obtain, evaluate, and communicate information using digital tools. For example, in Unit 5, Concept 1, Lesson 8, students explain asexual and sexual reproduction. They enter their explanation to the question, "Return to one of your questions from Engage and construct a scientific explanation or model to represent the answer to your question. You can select multiple communication formats to describe your thinking." by uploading either text, online presentations like video or drawings, or an online presentation into an interactive tool, and can directly see the rubric. Also, embedded editable documents/templates into lessons can be seen in Unit 4, Concept 1, Lesson 4. These resources allow students to engage with the content and to provide their research and hypotheses in included lesson materials.
- The materials provide real-life examples of the content and guide students to discover how scientific and engineering practices help solve these problems. For example, in Lesson 3 on Heart Rate and Homeostasis, students are given a chart of data and asked to draw conclusions based on what they learned during the lesson and how this data showcases how space flights impact humans' homeostasis and body functions. The digital technology of taking heart and respiration rates is discussed in the lesson and connected to science practices in the health industry.

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

- The materials provide a forum for students to post class discussion topics via written or video responses. For example, in Unit 5, Concept 1 Lesson 8, students can work together to submit their assignments about how they are explaining the overarching unit question. Students can also collaborate on multiple forms of online submissions and receive digital feedback from their

teacher. For example, in the Unit 5 STEM project starter, students collaborate with partners or groups to predict DNA size based on data. They submit this via a digital tool to get feedback from their teacher.

- The materials provide interactive Explore activities students can complete collaboratively in pairs or teams. For example, in Unit 2: Cells, Concept 1, Elaborate: STEM Project Starter where students "Employ everyday materials to design and construct a model of a cell membrane that relates the functions of biomolecules, including carbohydrates, lipids, and proteins, to cell structure and function." The teacher is provided with questions to ask them during this process. After students learn about concepts on a deeper level, they are encouraged to add any new ideas or explanations to their model.
- The materials include Studio, a collaborative workspace where students and teachers can insert images and media content from the Discovery Education program to create presentations or demonstrate their applications of scientific and engineering practices. Students can create question boards and work together to build models of each phenomenon covered. The Studio resource is found in the Collaboration tools.

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

- The materials are accessible and compatible with many devices students and teachers may have access to. This includes Chromebooks, iPads, desktop PCs, Apple computers, and/or smartphones.
- The materials include six single sign-on options through Google, ClassLink, and Office 365. These options allow districts to import the materials and ensure varied options are available to integrate digital technology. The user management options are available in the Integration and Access section of the help features. Reviewers can learn more about simple, safe access methods and integration into classroom workflows using the Classroom Technology Integrations hyperlink.
- The materials are compatible with six different learning management systems, including Google Classroom, Canvas, and Microsoft Teams. These programs allow districts to build online classrooms to help facilitate learning, incorporate the learning tools, and allow data to be compiled in formats such as CSV imports.

Discovery Education Science Techbook for Texas Biology

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 include a digital planning guide with live hyperlinks to other online multimedia resources to facilitate planning and ease of use. For example, in Unit 2, Concept 2, Lesson 4 (Homeostasis), students engage in an online simulation of homeostasis. Teachers are provided with an overview and hyperlinks to facilitate the simulation tool. Also, in Unit 3, Concept 2, Lesson 2 (Negative feedback loops), students use a hands-on lab to model negative feedback loops. The materials provide a video to explain this simulation. Finally, in Unit 2: Cells Concept 1: Cell Structure and Function- Lesson 1: Discovering Cell Structure and Function includes interactive digital KWL charts. An initial Claim and Model activity and a Structure and Function of Cells analysis question, "How can hibernation be explained by the relationship of functioning biomolecules to the structure and function of prokaryotic cells, compared with eukaryotic cells?" accompany the course readings.
- The curriculum offers helpful ancillary tools such as an interactive glossary, text-to-speech tools, and immersive readers that are accessible for students in the navigation bar for easy student access. These materials include useful student-focused technology tools like a calculator, graphing calculator, scientific calculator, unit converter, and whiteboard.
- The included digital tool, Studio, is developmentally appropriate and allows students to build their science knowledge and skills progressively. Students can utilize the online Studio space to create presentations and collaborate with their peers and teachers. This tool is found in the Discovery Education Help Center.

Discovery Education Science Techbook for Texas Biology

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

- The materials provide support for teachers to successfully integrate technology into the lessons. For example, whenever there are digital simulations, such as in Unit 2, Concept 2 Lesson 4 (Homeostasis), teachers and students are provided with a facilitator's and participant's guides to support their learning. Also, an orientation video introduces teachers to the program and all embedded digital resources.
- The materials provide specific teacher guidance for embedding the technology within lessons and assessments. This can be seen in the program guide that gives teacher guidance on how to use the digital tools for teachers and students, as well as how to use the core test interactive features, stating, "In digital Science Techbook for Texas, teachers have access to both the student view of content as well as the rich teacher supports in the Lesson Planning section, with additional access to differentiation supports at the point of use, digital tools, and other resources."
- The Program Guide provides guidance on how to use digital tools for teachers. This includes the Core Interactive Text Features that are built into the program. This embedded technology overview is shared with the teacher to ensure they are using all the tools they have access to with the program. The CITF provides 90 language translators, highlight features, note-taking features, and text-to-speech as well.

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

- The materials include a Caregiver Guide to introduce families to the materials and what they contain. This includes the curriculum layout, design, and rationale for sequencing. In the Caregiver Letter, each unit has a Home Connection activity encouraging parents to work with their children on a topic in the unit that could easily be searched online. This document is available in a pdf or for printing. For example, the Home Connection activity for a unit on Ecology is an embedded link to a virtual field trip to Discovery Polar Bear Virtual field lesson.
- In the Student Letter, students are told that they can track their progress through all of the course’s digital materials via a student dashboard. The dashboard gives them real-time access to all resources and their progress.
- Live links in the materials direct caregivers and students to phenomena-based activities. An example is seen in the Cells unit. The section states: “Phenomenon in the Home: Ask your child to play the Antigen Attack game, found at https://futurelabplus.com/files/interactives/virtual-journey-antigen-attack/. Developed by Discovery Education, it is used to demonstrate how germs sometimes cause diseases.”