Discovery Education Science Techbook for Texas Grade 8

Discovery Education Science Techbook for Texas Grade 8 Executive Summary

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

Grade	TEKS Student %	TEKS Teacher %	ELPS Student %	ELPS Teacher %
Grade 6	100%	100%	100%	100%
Grade 7	100%	100%	100%	100%
Grade 8	100%	100%	100%	100%

Section 2. Instructional Anchor

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

Section 3. Knowledge Coherence

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

Section 4. Productive Struggle

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

Section 5. Evidence-Based Reasoning and Communicating

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

Section 6. Progress Monitoring

- The materials include some variety of TEKS-aligned and developmentally appropriate assessment tools.

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- The materials include guidance that explains how to analyze and respond to data from assessment tools.
- The assessments are clear and easy to understand.

Section 7. Supports for All Learners

- The materials provide some guidance on fostering connections between home and school.
- The materials include listening, reading, writing, and speaking supports to help Emergent Bilinguals meet grade-level science content expectations.
- The materials include some 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, recurring themes and concepts, and grade-level content as outlined in the TEKS.

1	Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of grade-level appropriate scientific and engineering practices as outlined in the TEKS.	M
2	Materials provide multiple opportunities to make connections between and within overarching concepts using the recurring themes.	M
3	Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level as outlined in the TEKS.	M
4	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 make connections across disciplines and 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, recurring themes and concepts, and grade-level content as outlined in the TEKS.

Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of grade-level appropriate scientific and engineering practices as outlined in the TEKS. Materials provide multiple opportunities to make connections between and within overarching concepts using the recurring themes. Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level 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 make connections across disciplines and 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 grade-level appropriate scientific and engineering practices as outlined in the TEKS.

- The materials provide multiple opportunities to develop grade-level appropriate scientific and engineering practices, as outlined in the TEKS in a variety of lesson types, including STEM Project Starters, found in all concepts. For example, in a grade 8 lesson on Force, Motion, and Waves, the Unit Planner identifies the TEKS 8.1.A, 8.1.B, 8.1.C, 8.1.D, 8.1.E, 8.1.F, 8.1.G, 8.1.H, 8.2.B, 8.2.C, 8.2.D, 8.3.A, 8.3.B, and 8.3.C as standards taught in Concept 1. These TEKS correlate with the Scientific and Engineering Practices (SEPs).
- The materials provide multiple opportunities for students to practice grade-level appropriate SEPs. Each concept provides teachers with a 5E model that includes having students explore the various science concepts. SEPs are introduced in the Engage lesson, practiced/developed in the

Explore lessons, and assessed in the Explain lesson and Extension lessons. For example, in a grade 8 lesson "Observing Water Distillation," the materials guide students to draw a model of the phenomenon presented in the lesson. The materials then ask the students to describe the model, and after collecting further evidence, revise the models.

- The materials provide multiple opportunities to show mastery of grade-level appropriate SEPs. In a grade 8 lesson "Investigating Waves," the scope and sequence allows for the following: observations of the electromagnetic spectrum, investigation of wave properties, exploration of the visible light spectrum and other wave characteristics, explanation of the parts of the electromagnetic spectrum, elaboration of working with waves, and evaluation to show mastery of the unit. Each Concept includes an Evaluate section for students and a Summative Assessment Concept Check-In.
- Extended opportunities to practice the engineering design processes are available in multiple lessons. For example, in a grade 8 unit on "Weather, Climate, and Space," the materials introduce a phenomenon and students develop questions and conduct hand-on-activities to investigate the phenomena. Later in the same unit, the materials guide students to revise their explanations based on acquired knowledge. These additional practices include opportunities to design solutions to problems, evaluate them, and revise them. Additionally, investigations provide opportunities to practice analyzing data and building models. There are multiple opportunities for students to develop, practice, and demonstrate mastery of the grade-level TEKS.

Materials provide multiple opportunities to make connections between and within overarching concepts using the recurring themes.

- Science Techbook for Texas is intentionally designed to provide multiple opportunities to connect overarching concepts using the recurring themes.The Grades 6–8 Program Guide includes TEKS alignment and the recurring themes represented throughout the curriculum. The materials present science themes in the Concept Lesson Planner and in the Overview. For example, the grade 8 lesson "Observing Car Collisions" introduces the theme of Cause and Effect.
- Materials provide opportunities for students to use recurring themes in making connections between and within overarching concepts. For example, in the Investigating Waves concept, students begin to understand how telescopes are used to observe the universe by describing potential evidence that electromagnetic waves can transfer energy (Unit 1: Force, Motion, and Waves > Concept 2: Investigating Waves > Lesson 1: Observing Telescopes for Different Parts of the Electromagnetic Spectrum). As they investigate the properties of waves throughout the concept, they learn more about the wave characteristics that determine a wave's energy and how waves transfer energy but not matter. They also reflect on how the RTC of Energy and Matter (Unit 1: Force, Motion, and Waves > Concept 2: Investigating Waves > Lesson 6: Wave Behavior) helped them to understand the phenomenon of how telescopes work. In the Chemical Reactions concept, students continue to practice using the RTC of Energy and Matter as they investigate how mass is conserved as atoms rearrange during chemical reactions (Unit 2: Matter and Reactions > Concept 4: Chemical Reactions > Lesson 3: Investigating the Rearrangement of Atoms + Lesson 4: Chemical Reactions + Lesson 5: Investigating Reaction Rates). In the Impacts on Climate concept, students apply their understanding of energy and matter to investigate data on the increasing global temperature since the 1880s (Unit 3: Weather, Climate, and Space > Concept 3: Impacts on Climate > Lesson 1: Observing Increasing Global Temperatures). Across

the lessons in the concept, students draw connections between the cycling of matter in the carbon cycle and how carbon in the atmosphere connects to energy that is retained on Earth or radiated back into space. Finally, students have opportunities to make connections between overarching concepts using the RTC of Energy and Matter as they construct their final explanation for the increasing global temperatures (Unit 3: Weather, Climate, and Space > Concept 3: Impacts on Climate > Lesson 6: Explaining Increasing Global Temperatures).

- The materials include opportunities for students to revisit recurring themes across grade levels. In grades 6–8, students see how structure is related to function. Using this theme in grade 6, students study cell theory and the specialization of cells. In grade 7, students investigate how cells are part of an organization that makes up the human body. Students explore how cells can protect against infectious diseases. In grade 8, students further connect this learning with the investigation of cell parts and their functions.

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

- The materials strategically develop students' content knowledge and skills appropriate for the concept and grade level as outlined in the TEKS. The materials provide opportunities for students to conduct investigations for at least 40% of instructional time to support instruction in science standards. The Table of Contents allows teachers to see the systematic development of lessons as outlined in the TEKS. Teachers can view Unit Resources, which includes a Standards Alignment, to see where each concept is found within a lesson.
- The materials are systematically designed to develop and build student skills and content knowledge using phenomena appropriate to the grade level as outlined in the TEKS. Designed to build student understanding of the scientific concepts, each concept contains a series of 5E lessons broken into learning activities that follow a logical progression. For example, each concept starts with an Engage lesson, where students encounter a real-world phenomenon and develop initial models or explanations. In the Explore section, students engage in various activities and experiences to deepen their understanding of core concepts, revising their models and explanations along the way. The Explain lesson involves students preparing a final model or explanation supported by evidence and scientific reasoning. In the Elaborate phase, students connect and apply scientific ideas to real-world experiences and STEM careers. Finally, in the Evaluate phase, students demonstrate their understanding through summative assessments.
- In Science Techbook for Texas, the materials support teachers in developing students' conceptual understanding through the use of scientific and engineering practices and recurring themes and concepts. The program was intentionally designed so that students build content knowledge and skills by using SEPs and RTCs, allowing them to connect knowledge across concepts and make connections to real-world applications. Alignment to the identified TEKS is found in the first section of teacher lesson planning materials. Through hands-on lessons and virtual investigations throughout the course, students regularly address the SEPs of planning and conducting investigations by discussing or identifying variables and carrying out experiments and investigations. They address the SEP of developing and using models and constructing explanations through all Engage and Explain lessons of the 5E learning cycle. They practice recording and analyzing data in every hands-on lesson and interactive lesson.
- Additionally, RTCs are systematically introduced in every Engage lesson, where students are introduced to the concept-level phenomenon, then revisited again in the Explain lessons in conjunction with the core ideas. The teacher support in these lessons guides teachers to

develop students' content knowledge and skills through discussion prompts, differentiation callouts, and misconception callouts. The instructional design of this program authentically embeds the SEPs and RTCs into the learning cycle, and the lesson planning teacher notes for each lesson provide teachers with the guidance needed to support student sense making.

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 make connections across disciplines and develop an understanding of science concepts.

- 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 make connections across disciplines and develop an understanding of science concepts. For example, grade 8 materials provide regular opportunities for students to raise questions about phenomena. In a lesson about “Ecosystem Changes,” the materials guide students to observe plant and animal cells and develop a driving question board of questions they would need to know to figure out how this phenomenon takes place.
- Hands-on learning is a foundational component of Science Techbook and authentic science learning experiences. Students investigate scientific questions and phenomena through a variety of hands-on lessons in each concept. These experiences provide students opportunities to plan and conduct experiments, define and identify variables, develop models using manipulatives, analyze authentic data sets, and collect data to answer questions about phenomena. These instructional opportunities encourage students to use skills from other disciplines, such as ELA and Math. Hands-on lessons and STEM Projects also include experiences that allow students to apply the steps of the engineering design process to solve real-world problems, guiding them to make cross-curricular connections.
- The materials include a variety of hands-on lesson types, including step-by-step procedures for students to follow or more open-ended lessons that support students in developing their own procedures for their investigations. This program was intentionally designed to support student inquiry and questioning opportunities, followed by investigations and STEM projects to answer questions and allow students to make connections to real-world contexts. For example, within a grade 8 unit on “Cells, Genes, and Ecosystem Changes,” the lesson “Biodiversity Up Close” guides students to use a handout to create a data table and record the number of different organisms and species in a small area of a schoolyard. In a grade 8 unit “Force, Motion, and Waves,” the lesson “Trick Shot” guides students to collect and analyze data to determine how probability can improve predictions of objects’ behaviors. As an extension, the material suggests the teacher can challenge students to design their own golf course with obstacles and create a cheat sheet for participants playing the hole, which will indicate the best pathway for the golf ball to successfully fall into the hole. The materials include an Engineering Design Sheet to help scaffold the design aspect of the extension project.
- The materials provide repeated opportunities for students to use grade-level appropriate scientific and engineering practices across various contexts throughout the course. For example, the Unit Structure and Pacing Guide, found within Unit Resources, provides teachers with a scope and sequence of lessons that indicates when hands-on activities and investigations will occur in the unit.

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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, recurring themes and concepts, and grade-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, recurring themes and concepts, and grade-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, recurring themes and concepts, and grade-level content as outlined in the TEKS.

- The materials use phenomena as a central anchor that drives student learning across grade-level content in each discipline (earth/space, life, physical science). Students examine phenomena and develop content knowledge as they work to construct explanations of the phenomena.
- The materials embed phenomena and problems across all lessons by including an authentic phenomenon in Lesson 1 for every concept within every unit. In a grade 8 lesson, "Energy in the Atmosphere," the materials guide students to make observations and create a student question board based on what they have observed about Hurricane Harvey. The materials then scaffold the content, guiding students to make an initial explanation of how and why hurricanes occur. The materials further guide students to continue building and developing their knowledge through hands-on activities, interactive computer modules, and readings.
- The materials provide intentional opportunities for students to develop, evaluate, and revise their thinking as they engage in phenomena and define and solve problems. After the students examine the phenomena in Lesson 1, the materials then guide the students to reconsider the phenomenon in the exploration part of the lesson (Lesson 2) through a hands-on investigation.

The materials then return students to their initial observations and explanations after they have acquired new science concepts during the Phenomenon Check-In portion of the lesson.

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

- The materials provide opportunities for students to leverage knowledge and experiences related to the phenomena. Teachers have guidance provided in the lesson planning section of each unit to help students recall previous knowledge. Every concept and lesson included in Science Techbook for Texas, Grade 8, begins with a "Setting the Purpose" section, designed to allow teachers to leverage and solicit students' prior knowledge of key science ideas before the main learning objective of the lesson. In addition to accessing prior knowledge for every lesson of every concept, the first lesson in each concept, the Engage lesson, expects students to discuss with one another their prior knowledge and experience with the presented phenomenon. Often students' prior knowledge and experiences are solicited through discussion opportunities or small group strategies. For example, in a grade 8 lesson, "Matter and Reactions," "Setting the Purpose" directs teachers to "Show students a cup of water with dirt and salt mixed in it. Ask students to take a moment to think about how they might distill the water so that it is drinkable in an emergency or on a camping trip. Then, have them turn to a partner and share their ideas. Have a few students share what they and their partner discussed."
- Across all concepts, common, research-based misconceptions are included in teacher-facing lesson planning sections. Most of these misconception teacher notes include an explanation or practical strategy to support students in overcoming barriers to conceptual development. In the grade 8 lesson, "Investigating Acids and Bases," the materials guide the students to investigate and compare the properties of acids and bases. The materials provide guidance for the teacher to address potential misconceptions; "Students may think that all acids and bases are especially strong or powerful, such as stomach acid (hydrochloric acid) or household bleach (sodium hypochlorite, a strong base). Point out that even relatively mild solutions can be acidic or basic, including the solutions that students are investigating."
- The materials provide additional student and teacher background knowledge in the Unit Resources section, "Background Knowledge." The materials include what teachers need to know and what students should know, and the misconceptions they may have. While there is information provided to help address the most common misconceptions in each Lesson Planning document, these are dispersed throughout the lessons. It would be helpful to the teacher to have a misconceptions document at the beginning of each Concept that identifies the most common misconceptions and how to address them from the very beginning because students may address a misconception before it is brought up in the lesson planning document.

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 goals behind each phenomenon or engineering problem. The Unit Planner for each unit provides a rationale for the phenomena, concept objectives, and key vocabulary. Each Concept section includes a "Teacher Overview." For example, in a grade 8 lesson, "Applying the Laws of Motion," the materials provide teachers with a list of objectives that students should be able to complete by the end of the lesson, such as "use a model to investigate the laws of motion in a system,

explain how the laws of motion work together in a system, revise a model about how Newton's three laws of motion act simultaneously during car crashes, and describe how the laws of motion apply in STEM careers."

- The materials clearly outline the scientific concept objectives and goals behind each phenomenon for the teacher at the lesson level. Each lesson includes a "Lesson Planning" section which includes the goals and sets the purpose for the lesson. Each lesson includes student objectives.
- The materials identify the student learning goal(s) behind each phenomenon or engineering problem. For example, in a grade 8 lesson, "Observing Car Collisions," the materials list the student objectives as "I can make observations, ask questions, and develop a model to explain how Newton's three laws of motion act simultaneously during car crashes."

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Indicator 3.1

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

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

Evidence includes but is not limited to:

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

- Materials connect new learning to previous and future learning within and across grade levels. Materials provide an overview of the vertical alignment, which can be found in the *6-8 Program Navigation and Vertical Alignment Guide*. For example, materials scaffold the concept of Matter across grades 6 through 8. In the grade 6 Matter and Properties unit, Identifying New Substances concept, materials focus on TEKS 6.6.E "Identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change." In the grade 7 Matter and Solutions unit, Physical and Chemical Changes concept, the lessons build upon the grade 6 knowledge and focus on TEKS 7.6.C, “Distinguish between physical and chemical changes in matter." In the grade 8 Matter and Reactions unit, Chemical Reactions concept, materials focus on TEKS 8.6.B, “Use the periodic table to identify the atoms involved in chemical reactions.” and 8.6.E, “Investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis."
- Materials guide students to connect their knowledge and skills within units in their grade level. For example, in the grade 8 Weather, Climate, and Space unit, Concept 4: Stars and Galaxies, students begin their exploration of space with a photo from the Webb Telescope. Materials

guide students to make statements about what they see in the photo. Students continue their exploration of space by learning about the absolute and apparent magnitude, star formation, and life cycle of stars. Materials include a check-in after this new knowledge is built to see if their statement about the deep space image is still accurate. This allows students to build and connect their knowledge and skills from the beginning of the unit to the end.

- Materials present content in a way that builds complexity within and across units. Materials present each concept in the 5E format. Each concept begins by introducing a real-world phenomenon to engage students and encourage them to ask questions. This is done through hands-on investigations, images, data sets, or multimedia in the Engage lessons. As students progress, they revisit the phenomenon to deepen their understanding. In the Explore section, students engage in various activities such as hands-on investigations, digital interactive experiences, multimedia analysis, and integrative literacy learning. In the Explain phase, students provide explanations supported by evidence and scientific reasoning to explain the phenomenon. The Elaborate phase involves making connections and applying concepts to real-world experiences, including STEM careers and projects. The Evaluate section consists of summative assessments that allow students to apply their knowledge.
- For example, in the grade 8 Weather, Climate, and Space unit, Impacts on Climate concept, materials engage the students with a phenomenon graph showing the global average surface temperature over time. Materials then allow students to explore these ideas with a hands-on investigation of the greenhouse effect. Materials guide students in the *Explaining Increasing Global Temperatures* lesson to revisit their initial observations, revise their models, and reflect on and describe them. The Elaborate lesson, *Careers and Climate,* has students learn how ideas about impacts on climate apply to STEM careers. Finally, in the Evaluate section, students summarize the key concepts they have learned.

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

- Materials include a progression of concrete and then representational before abstract reasoning when presenting concepts. In the grade 7 concept Physical and Chemical Change, the lesson *Observing the Reaction in a Bag* provides students with a concrete phenomenon to investigate and develop questions related to physical and chemical changes in experiments. Students then conduct concrete, hands-on investigations to understand the phenomena better. Materials then guide students to revisit and revise questions. Materials repeat this for each concept until the phenomena are revisited and revised a final time. The extension lessons guide students to investigate how solubility and temperature are related, providing additional opportunities for deeper understanding.
- Materials ensure students experience a phenomenon or problem before utilizing models as a tool for reasoning. Specifically, in each unit, Materials include a hands-on activity within the lesson sequence. This hands-on activity happens before students complete further investigation of the phenomena. In the grade 8 Matter and Reactions unit, Concept 3: Acids and Bases guides students to begin the lesson with an observation of a teacher demonstrating what happens when they place indicators into common household items. Based on these observations, students write an initial explanation of the phenomena. Students continue their investigation of acids and bases and revise and edit their explanation of the phenomena based on the scaffolding found within the lessons.

- TMaterials sequence instruction in a way that activates or builds prior knowledge before explicit teaching occurs that allows for increasingly deeper conceptual understanding. Materials present students with a phenomenon and guide students to share personal experiences and ideas and then engage in inquiry-based exploration before there is any explicit teaching. For example, in the grade 8 Force, Motion, and Waves unit, a lesson on the concept of Applying the Laws of Motion focuses on TEKS 8.7.A “Calculate and analyze how the acceleration of an object is dependent upon the net force acting on the object and the mass of the object using Newton's Second Law of Motion” and 8.7.B “Investigate and describe how Newton's three laws of motion act simultaneously within systems such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.” In Lesson 1, materials present the students with videos showing cars colliding during vehicle test trials and ask the students to make observations, develop a driving question board, and create an initial model of the phenomenon. In Lesson 2, materials allow the students to explore the concepts behind the phenomenon they observed in the first lesson. Materials state the objectives for Lesson 2 as "I can investigate how force and mass affect acceleration" and "I can investigate how atoms combine to form elements and compounds." In Lesson 4, students analyze their prior experiences and data gathered in the prior lessons to formulate scientific ideas. Students have those ideas backed up with explanations in this portion of the materials. Materials state the objective for Lesson 3 as "I can explain how force, mass, and acceleration are related."

Materials clearly and accurately present grade-level-specific core concepts, recurring themes and concepts, and science and engineering practices.

- Materials clearly provide instruction in grade-specific core concepts. Each concept in each unit consists of several lessons that follow the 5E (Engage, Explore, Explain, Elaborate, Evaluate) instructional model. This allows for a clear presentation of grade-level-specific core concepts and a meaningful integration of Recurring Themes and Concepts (RTCs) and Science and Engineering Practices (SEPs).
- Materials clearly provide instruction in RTCs and SEPs. In the first lesson of each concept, materials present the students with a phenomenon. Materials ask the students to think about the phenomenon using one of the recurring themes. For example, in the grade 8 unit about Cells, Genes, and Ecosystem Changes, the Cell Functions concept guides students to observe cells and use the recurring theme of structure and function to “choose objects from both types of cells, describe or draw them in the column labeled structure, and think about what function the object might be able to carry out based on how it is built or appears. Then think about what structure in a school would carry out a similar function and list it in the table.” In that same lesson, materials ask the students to engage in the SEP of modeling.
- Materials accurately present core concepts, RTCs, and SEPs. Across lessons, units, and grade levels, materials are free from scientific inaccuracies. Materials present current scientific content that reflects the most widely accepted explanations. For example, in the grade 8 unit about Matter and Reactions, the lesson *Investigating Chemical Reactions* introduces the conservation of mass with the concept of chemical changes to help students understand the processes that take place within the laws of science.

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Mastery requirements of the materials are within the boundaries of the main concepts of the grade level.

- Materials include guidance for the teacher on specific learning targets for each concept, located in the Teacher Overview section. For example, in a grade 8 unit about Matter and Reactions, Concept 1: Classifying Matter lists the Concept Objectives: “Make observations as water is distilled, ask questions, and develop an initial model about the process. Classify matter based on its atoms, molecules, and properties. Classify mixtures based on their atoms, molecules, and properties. Explain how pure substances and mixtures are classified. Revise a model of distilling water based on evidence gathered from investigations. Describe how the classification of matter applies to STEM careers. Summarize key ideas about the classifying matter.”
- The Scope and Sequence in the Grades 6-8 Program Guide lists the TEKS addressed and their sequence for each grade. Materials include guidance for the student on specific learning targets for each lesson. Each lesson includes a Student Objective for students to revert back to while going through the material. For example, in the grade 8 unit Matter and Reactions, the lesson *Observing Water Striders Walking on Water* begins with the Student Objective, “I can make observations, ask questions, and write an initial explanation about how water strider insects are able to walk on water.”
- Materials include a Vertical and Horizontal Alignment Guide that defines the boundaries of the main concepts that students must master for the grade level or course. This document helps teachers know where the students are coming from and where they are going in their learning.

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

Partial Meets | Score 3/6

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

Materials support teachers in understanding of the horizontal and vertical alignment guiding the development of grade-level content, recurring themes and concepts, and scientific and engineering practices. Materials contain some explanations and examples of science concepts, including some grade-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 horizontal and vertical alignment guiding the development of grade-level content, recurring themes and concepts, and scientific and engineering practices.

- Materials include guiding documents that support teachers in understanding how concepts connect across lessons and units within the grade level. Grade 8 materials, for example, provide a Unit Planner for each unit that provides a horizontal guide of concept connections. The materials also provide an overview of the vertical alignment, which can be found in the 6-8 Program Navigation and Vertical Alignment Guide.
- The program is intentionally designed to provide both horizontal and vertical articulation of the grade-level content, recurring themes and concepts, and science and engineering practices, supporting teachers in understanding how new learning connects to learning from previous grades. Materials include a Vertical and Horizontal Alignment Guide that supports teachers in viewing the full scope and sequence across all grade bands (elementary, middle school, and high school.)
- Materials include general background knowledge for teachers regarding the concepts they are teaching. Search functionality, found in the top navigation bar within the product, allows for a teacher to search for additional support to build their own subject knowledge. Filters by grade band allow teachers to look for topics below and above the grade level of their students.

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

- Materials include background information for teachers that provides explanations and examples of science concepts. For example, a Background Knowledge document is included in the Unit Resources section of each unit for teachers who may need to build their own subject knowledge. This document provides both teacher and student background information about the concepts within the unit.
- While the publisher has provided some lessons that include misconceptions, they are not included in all lessons within the unit. In addition, there is not adequate guidance for teachers and students to address potential areas of misunderstanding. Materials identify some common grade-level misconceptions students may have about some science concepts. However, materials do not address these misconceptions or barriers in every lesson, and they are not revisited throughout the unit as the potential area of misconception is revisited. Materials do not include guidance for the teacher on how to facilitate discussion about misconceptions when student explanations are based on incomplete or incorrect information. For example, in a grade 8 lesson, *All Mixed Up*, the misconception section states, "Students may think that colloids, suspensions, and solutions always involve the liquid state of matter. In fact, each type of mixture may form from any combination of solids, liquids, and gasses. Steel is a solution of solids, and the atmosphere is a solution of gasses. Several types of foam are colloids in which a gas is dispersed throughout a solid. Tell students that they will learn much more about the classification of matter as they continue in this concept." The materials provide no guidance on learning experiences to clarify the misconception.
- Materials do not support teachers in developing their own understanding of more advanced grade-level concepts. While the search functionality allows teachers to search for additional grade bands, it can only be utilized at the unit level, not at lesson levels. There are no linked additional resources for the teacher to deepen their own understanding of concepts and material.

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

- Materials provide a purpose or rationale for the programs' instructional design, highlighting its key features. For example, the *Grades 6-8 Program Guide* explains the rationale of the structure of units, concepts, and 5E framework lessons. "Units, concepts, and lessons are designed to pique student interest and scaffold acquisition of specific scientific ideas as students learn about the world in which they live."
- Teacher guidance materials explain the purpose of beginning each unit with a phenomenon. For example, the *Grades 6-8 Program Guide* states, "All concepts begin by focusing on real-world phenomena. These phenomena pull in students and give them a reason to explore the scientific investigations in the concept. Students make observations, ask questions, and develop explanations or models of the phenomena. As they gather evidence during their investigations, they find answers to their questions and revise their models or explanations. Ultimately, the phenomena increase coherence and make science relevant to students' lives."
- Materials provide a framework explaining the main intent or goals of the program. Materials provide a Program Guide that thoroughly describes the program's instructional approaches and

references the research-based strategies present in the materials. For example, the *Grades 6-8 Program Guide* describes:

- Use of the 5E Framework
- Leveraging Phenomenon-Based Learning
- Role of hands-on learning
- Role of the science and engineering practices
- Role of recurring themes and ideas
- Integrating grade-level content and skills, SEPs, and recurring themes and ideas
- Role of habits of discussion and productive struggle

Discovery Education Science Techbook for Texas Grade 8

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 grade-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 grade-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.

- Materials define sensemaking and identify specific sensemaking behaviors of students. The *Grades 6-8 Program Guide* provides teachers an explanation as to why there has been a switch from simply explaining the science concepts to students to allowing the students to examine and explain real-world phenomena on their own. "When phenomena are carefully selected to be relevant to students, the phenomena spark students' curiosity and provide a reason for them to engage in the learning as they make sense of how and why the phenomena occur. Students build their understanding of science ideas through the process of developing and revising explanations and models."
- Materials provide students with various ways to learn each concept. Students can make observations, complete hands-on activities, read corresponding articles about the phenomena, and apply and analyze the concept. For example, in the grade 8 Cells, Genes, and Ecosystem

Changes unit, Concept 2: Genes and Variation guides students to make observations on a video involving thousands of rabbits in Japan. Once students make their initial claim as to why the phenomena occur, materials direct students to create punnett squares to discover how genes affect traits. Students then solidify their understanding of genes and alleles through videos and readings. Once complete, materials guide students to revisit their initial claim and make revisions based on this new knowledge. Students then apply this concept to other real-world problems.

- Materials consistently provide learning activities that support students' meaningful sensemaking. In the grade 8 Weather, Climate, and Space unit, the *Energy and the Water Cycle* lesson states the Student Objective: "I can describe how the energy and the water cycle influence weather and climate." Students read and share paragraphs and complete a think, pair, and share about the reading. Students then watch a video about the topic and synthesize the information from the various resources to list similarities and differences. Students complete a check for understanding and then revisit their phenomenon questions to write a response to the previously developed question. Students then write a revision of their phenomenon explanation.

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

- Materials allow students to engage in purposeful and targeted activities with grade-level appropriate scientific texts. According to the *Grades 6-8 Program Guide, "*During reading, students stop and make connections, monitor their understanding, and generate questions for sensemaking. After reading, students have opportunities to communicate, respond to, and reflect on scientific ideas from the text." For example, in the grade 8 Weather, Climate, and Space unit, Lesson 3: *Energy and the Water Cycle*, materials ask students to gather information about how energy and the water cycle affect weather and climate. Students read passages about weather and climate, the water cycle, and the water cycle's effects on weather and climate. Between each section, materials provide students with reflection questions and ask the students to reflect and discuss. After the reading, students complete a concept map depicting the role energy plays in the water cycle.
- Materials provide opportunities for students to engage with scientific texts, including activities, such as pre-reading and vocabulary, to help them develop an understanding of concepts. Materials include key vocabulary and strategies for supporting vocabulary throughout the lessons of each concept. Additionally, materials hyperlink key vocabulary terms in the interactive glossary in student-facing text and the toolbar for easy student access. The interactive glossary can be accessed by clicking on the three dots in the top right corner of the window of the course page or any concept or lesson in the course. For example, in a grade 8 lesson: *Investigating the Role of Energy in the Water Cycle*, materials include four vocabulary terms hyperlinked to the interactive glossary: atmosphere, weather, energy, and climate.
- Teacher materials clearly list an overview of key vocabulary terms for each unit listed by concept in the Unit Planner. For example, in the grade 8 Force, Motion, and Waves unit, the Unit Planner identifies the key vocabulary terms for the Investigating Waves Concept: absorption, amplitude, crest, electromagnetic waves, frequency, longitudinal waves, peak, reflection, refraction, transverse waves, trough, wavelength.

Discovery Education Science Techbook for Texas Grade 8

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 provide opportunities for students to communicate thinking on scientific concepts in written and graphic modes. Materials allow students to show their thinking through the use of graphic organizers and written responses. Materials provide structures to facilitate the sharing of these written forms to help students refine their thinking. For example, in a grade 8 lesson, *On Your Wavelength*, within the Force, Motion, and Waves unit, students explore the relationship between wavelength and frequency in visible light waves. Materials allow students to organize their findings and observations in a data table. In the grade 8 Weather, Climate, and Space unit, the lesson *Explaining Temperature Differences at the Same Latitude* directs students to first write a reflection on how their understanding of the phenomenon (media comparing the weather in Canada and England) has changed. They then draw a revised model of the temperature differences in cities of the same latitude. Finally, they write a description of their model.
- Materials allow students to create graphs to capture and share their understanding of scientific concepts. For example, in the grade 8 Matter and Reactions unit, *Classifying Substances and Mixtures* lesson, materials ask students to record the record high temperatures (in Celsius) for each day during a recent month in the region in which they live. Students then place that data into a data table using the digital tools provided. Students then communicate the data in a histogram to help build and communicate their understanding of the concept.

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.

- Materials provide authentic student engagement and perseverance of concepts through productive struggle while acting as scientists and engineers. Students are expected to use evidence to support hypotheses and claims. When conducting investigations, students return to their predictions after analyzing their data to determine if the data supports their claims. They then construct and present developmentally appropriate written and verbal arguments that justify their data and observations using the evidence they acquired. For example, in the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Investigating the Cell Membrane* directs students to develop and use a model to investigate the functions of the cell membrane. Materials guide students to record evidence observed from the soap bubble model about the functions and characteristics of cell membranes, then create a summary in fifty words or fewer to show their understanding of cell membranes.
- Materials support students as “practitioners” while they are figuring out (sensemaking) and productively struggling. Materials prioritize students making evidence-based claims to construct explanations of how and why the phenomena or problem occurs. In Engage, students act as scientists and engineers by observing real-world phenomena and design challenges. Students consider a driving question that relates to the phenomenon and is unable to be answered prior to completing the concept lessons. Students return to analyzing the phenomenon throughout the concept with phenomenon check-ins. Finally, in the Explain portion, materials guide students to use their collected evidence to support a scientific explanation. For example, in the

grade 8 Matter and Reactions unit, Concept 4: Chemical Reactions, the Techbook includes the following:

- Lesson 1: Students make observations of different balloon ignitions, ask questions about them, and construct an initial explanation about them. Students develop an initial explanation of the phenomenon.
- Lessons 2-3: Students engage in activities that build their sensemaking regarding the phenomenon.
- Lesson 4: Students participate in a "phenomenon check-in" and are asked, "Now that you have learned about chemical reactions, revise the explanations that you wrote at the beginning of the concept. Review the explanations written at the beginning of the concept and discuss with your classmates ways to revise and refine them. As you share with one another, cite evidence from each lesson that supports the components of your explanation."
- Lessons 5-6: Students engage in activities that build aid in their sensemaking regarding the phenomenon
- Lesson 7: Students make final revisions to their explanations of the phenomenon based on evidence gathered from investigations.

- Materials create transfer opportunities for students to take what they have learned and use it flexibly in new situations. In the grade 8 Matter and Reactions unit, Concept 4: Chemical Reactions first provides students with a brief explanation of chemical reactions. Students then observe a virtual balloon explosion lab. In the next lesson, with the same concept, students conduct a hands-on investigation of inflating a balloon with gases released from a chemical reaction. The next lesson then relates the information to other reactions, such as fireworks, wood burning, and igniting fuel. Later, students continue investigating and learning about additional chemical reactions and their evidence. At the end of the concept, materials give students additional opportunities to revisit the phenomenon questions that they had previously answered.

Discovery Education Science Techbook for Texas Grade 8

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 grade level.	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 grade level. 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.

- Materials provide opportunities for students to develop how to use evidence to support their hypotheses and claims by using the 5E model of instruction. Materials present students with a phenomenon (or an engineering problem) in the Engage lesson of every Concept to produce an initial explanation (or a solution to the problem). In the following Explore lessons, students construct new knowledge. In the Explain lesson of each Concept, materials provide students an opportunity to use evidence to support their claims in an effort to improve their initial explanations based on what they learned throughout the Concept. For example, in the grade 8 Matter and Reactions unit, Chemical Reactions concept, the Explain lesson guides students to produce an explanation (their claim) to the driving question that was developed from the phenomenon (why does the hydrogen balloon combust?) "Evaluation Criteria" in the student materials ask students to use evidence to support their claims using Claim-Evidence-Reasoning criteria.
- Materials specifically prompt students to use evidence when supporting their hypotheses and claims. In Explain, materials guide students to provide a final explanation of the phenomenon. Students then review and reflect on the observations and evidence they have collected during

the Explore parts of the lessons and revise their explanations. For example, within the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Explaining Rapidly Reproducing Rabbits* prompts students: "Now that you have learned more about genes and variation, write a final explanation for what could have caused the large number of different colored rabbits on the island." In the criteria for success, materials provide students with the following guidance for on-target evidence: "identifies valid and reliable evidence from multiple sources; may include models to support the explanation."

- Materials provide prompts for students to utilize evidence in their claims. In the grade 8 lesson *Explaining Car Collisions,* within the Force, Motion, and Waves unit, materials prompt students to revise their model on how Newton's three laws of motion work simultaneously in a car crash. Materials prompt students to utilize the information and evidence gathered throughout the unit to revise their original model of the phenomena.

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

- The Techbook includes embedded opportunities for students to develop and use vocabulary after having a concrete or firsthand experience to which they can contextualize new terms. For example, in grade 8, students explore genetics in the Genes and Variation concept within the Cells, Genes, and Ecosystems unit. In the first two lessons, students engage in activities exploring the concept of variation and Punnett squares. In the third lesson, materials introduce the terms gene and allele. Students engage in a reading activity and watch a video in which they can experience and contextualize the new terms. Materials then prompt students to discuss the following: "What are alleles? What genotypes do tongue rollers have? What genotypes do non-tongue-rollers have? What is the purpose of a Punnett square? Why does every gene you inherit have two alleles? What happens when a dominant allele is present in a gene? How are genotype and phenotype different? Is blonde hair a genotype or a phenotype?"
- Materials present scientific vocabulary using multiple representations. The lessons have vocabulary words in color and hyperlinked to the glossary link for the words. The glossary includes audio pronunciation, written definitions, key context, real-world images, and video explanations of the words used in context. Some words also include animations. Students can also access the entire glossary using the three-dot drop-down menu on the upper right corner of the screen.
- Materials allow students to use scientific vocabulary in context. Within the grade 8 Weather, Climate, and Space unit, the lesson *Ocean Currents and Cyclones* prompts students to watch a video and read an article to gather information on how ocean currents and air masses interact to create hurricanes and typhoons. Students read an article about ocean currents and the global conveyor belt before answering questions with a group. These questions probe students to utilize the vocabulary terms to answer the questions correctly.

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

- Materials provide opportunities for students to develop how to engage in argumentation and discourse. Research-based SOS strategies found in the program expect students to share their ideas with one another as they synthesize and deepen their understanding of the grade-level content. For example, in the grade 8 lesson *Investigating Punnett Squares,* within the Cells, Genes, and Ecosystem Changes unit, students engage in the SOS strategy called Concept Circles.

"Concept Circles are traditionally used to visualize and analyze the relationship between key vocabulary words. In this modification, students are asked to connect a main idea with the vocabulary words from the lesson using a Concept Table. This promotes a deeper understanding of vocabulary because students are asked to analyze terms and their connectedness to the central idea of the lesson."

- Materials integrate argumentation and discourse within stages of the learning cycle. Materials guide students to conduct grade-appropriate academic discussions to analyze data and evidence to build their conceptual understanding of each concept. Across the program, these opportunities are highlighted by discussion prompts, as well as additional questioning prompts found in the teacher materials. Materials introduce students to constructing an argument for their own interpretation of the phenomena they observe. Materials provide instructional support to help students go beyond simply making claims. For example, in the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Genetic Variation and Adaptation* provides students opportunities to engage in discourse at five different points in the lesson. Materials provide the following question prompts:
    - "Have you noticed that the bananas in the supermarket all seem to look the same? Those bananas are actually more similar than you think. Nearly every banana you have ever eaten is genetically identical. Although there are a thousand varieties of bananas across the world, the ones we see at the supermarket—Cavendish bananas—are essentially clones with the exact same genes. Why might this be risky? Why is genetic diversity important for populations?
    - Discuss the following with a classmate: What are the pros and cons of bananas with no genetic variation? Why is genetic variation important for a population?
    - Discuss the following questions about what you read: What are two reasons that genetic variation exists? How do alleles contribute to genetic variation?
    - Think about what you read and answer the following questions about the passage: Why does genetic variation occur in a population? Why is genetic variation important for the survival of a species?
    - Complete the following to refine your understanding of genetic variation and adaptations. Discuss the following questions: What are the different types of adaptations? What creates genetic variation? Why is genetic variation important in a population?"
- Materials allow students to engage in discourse by allowing them to create an initial model of the phenomena, gather information about the phenomena, and revise their model based on new knowledge and peer feedback. For example, in the grade 8 Matter and Reactions unit, the lesson *Explaining the Distillation of Water* prompts students to take what they have gathered about classifying matter and share their models within a group. The Lesson Planning document helps guide teachers in the revision of student models. First, the teacher breaks students into groups of three or four. Then, students consult the models that each person made during the Engage section of the unit. Students use discourse to find similarities between each model and which aspects may need to be changed. Students then use this information and revise their original model of the phenomena.

Discovery Education Science Techbook for Texas Grade 8

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.

- Materials provide instruction for how to construct and present a verbal or written argument to problems using evidence acquired from learning experiences. The Techbook uses the 5E model of instruction to present students with a phenomenon or an engineering problem in the Engage lesson of every concept. In the following Explore and Explain lessons, students construct new knowledge. In the Evaluate lesson of each concept, materials guide students to construct developmentally appropriate written and verbal arguments that justify explanations of phenomena based on what they learned throughout the Concept. For example, in the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Explaining Rapidly Reproducing Rabbits* prompts students: "Now that you have learned more about genes and variation, write a final explanation for what could have caused a large number of different colored rabbits on the island." In the criteria for success, materials provide students with the following guidance for on-target evidence: "identifies valid and reliable evidence from multiple sources; may include models to support the explanation."
- Materials allow students to present written arguments that justify their claims to phenomena using different modes, such as graphic organizers. For example, in the lesson *Genetic Variation and Adaptation*, within the grade 8 unit Cells, Genes, and Ecosystem Changes, students gather information about why genetic variation is better for the survival of a species. Once students gather information through the readings and videos, they create a 3-2-1 pyramid graphic organizer with the following: three facts in the top, two ways the information is important in the second row, and a one-sentence summary in the bottom row.
- Materials provide criteria for developmentally appropriate arguments to explain a phenomenon or defend a solution to problems using evidence acquired from learning experiences. Materials provide embedded rubrics or criteria for success throughout the lessons. These rubrics include detailed criteria for students when engaging in arguments from evidence. For example, in the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Explaining Rapidly Reproducing Rabbits* includes a rubric for students with the "on-target" scale as follows:
    - "Claim: states an answer to a question or scientific explanation of the phenomenon that represents the relationships between variables or components of the phenomenon
    - Evidence: identifies valid and reliable evidence from multiple sources; may include models to support the explanation
    - Reasoning: shows how or why the evidence supports the claim and describes why the evidence is adequate or not adequate to support the claim."

Discovery Education Science Techbook for Texas Grade 8

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.

- Materials provide teachers with possible student responses to questions and tasks. Teacher materials provide correct responses for all prompts, including discussion prompts and formative and summative assessments in the program. For example, in the grade 8 Cells, Genes, and Ecosystem Changes unit, the Lesson Planning document for the lesson *Investigating Food Web Disruption* provides the teacher with a prompt and possible student responses. "Discuss the following questions using reasoning and evidence from the investigation:
    - What patterns do you notice when an organism is removed from a food web? Sample response: When a food source is removed, all organisms up the chains of the food web decrease. When a predator is removed, the prey population increases. When a predator increases, the prey population decreases.
    - What would happen if a producer increased in a food web? Sample response: All populations up the food web would increase.
    - What would happen along a chain of the food web if a tertiary consumer increased? If a primary consumer increased? Sample response: If a tertiary consumer increased, the secondary consumer would decrease, the primary consumer would increase, and the

producer would decrease. If a primary consumer increased, the producer would decrease, but all other populations up the chain would increase.
    - How can a change in one species affect multiple chains or even all organisms in a food web? Sample response: Organisms usually have multiple connections on a food web and affect multiple chains on the web. A change in one population often affects populations above and below it on a chain. Since many chains are connected to the same producers, one species can potentially impact the entire food web."
- Materials provide teacher responses to possible student responses, including how to build on students' thinking. Each Lesson Planning document provides information in the Misconceptions and Differentiation sections. This information provides some teacher responses to student thinking and responses. Formative assessment items, found in the Check for Understanding section in Explore lessons, provide scaffolded feedback directly to students when they indicate incorrect or partially incorrect responses. For example, within the grade 8 Force, Motion, and Waves unit, the Check for Understanding portion of the lesson *Investigating the Second Law* provides the following feedback when students select incorrect answers: "Not quite. Think about what happened when you increased the mass of an object."
- Materials provide support for teachers to deepen student thinking through questioning. Teacher materials include questions that deepen student thinking at various points across the lesson. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *Applying the Laws of Motion* includes in the Setting the Purpose section of the Lesson Planning document the following directions for the teacher:
    - "Begin the lesson by having students note things they observed today that either speed up or slow down. They can even include themselves. Ask students to share with a partner what they know about things that accelerate. Have students read the introductory paragraph and discuss the questions with a classmate.
    - Discuss your ideas about the following questions:
    - What are other examples of acceleration you encountered today? Sample response: walking in the hallway, turning a corner, jumping, dropping a pencil, throwing a ball. What affects how much an object accelerates? Sample response: forces applied to it; directions it moves in; speeds it travels with; time it takes to speed up and slow down."

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

- Materials have built-in scaffolding for concept and vocabulary development in the design of the learning sequence by using the 5E model of instruction. All concepts start with Engage, a phenomenon (or an engineering challenge) that provides opportunities to elicit students' prior knowledge. Carefully sequenced Explore activities provide students with an opportunity to develop new vocabulary in the context of the scientific concept. Students then have multiple opportunities to use this new vocabulary to explain the phenomenon and answer other emerging questions. For example, in the grade 8 Weather, Climate, and Space unit, the Energy in the Atmosphere concept introduces students to a phenomenon (using a video of Hurricane Harvey to describe the weather event.) Students then conduct several investigations where they develop new vocabulary (atmosphere, climate, convection, energy, hydrosphere, water cycle, weather) in the context of weather, winds, and convection. They use these new vocabulary words in explaining the phenomenon (Explain and Evaluate lessons) and answering emerging questions (in the Elaborate lesson.)

- Materials provide embedded support for the teacher in how to introduce and scaffold students' development of scientific vocabulary. For example, each concept in the materials begins with a Teacher Overview that previews the vocabulary that will be used in the unit. Materials include key vocabulary terms for both the student and teacher at the beginning of each concept. For example, in the grade 8 Force, Motion, and Waves unit, the Applying the Laws of Motion concept lists the following vocabulary terms: accelerate balanced forces, force, friction, gravitational force, inertia, law, mass, normal force, speed, theory, unbalanced force.
- Materials provide guidance for the teacher on how to support students' use of scientific vocabulary in context through instructional videos. These videos can be accessed through the Educator Support page of the product website under the Instructional Strategies section within the Vocabulary Development title. Materials include many videos providing useful guidance for teachers on supporting students in vocabulary development; for example, the video titled "Fold, Draw, Learn."
- Materials provide guidance for the teacher on how to support students' use of scientific vocabulary in context. For example, throughout the concept, as students build a conceptual understanding of the key vocabulary, teacher materials include an indication, at the point of use, when to bring in and facilitate students' proper use of academic vocabulary during the lesson. For example, in the grade 8 Lesson Planning document for *Observing Telescopes for Different Parts of the Electromagnetic Spectrum*, within the Force, Motion, and Waves unit, materials provide the following guidance for the teacher:
    - "After students understand the science ideas involved with key vocabulary term electromagnetic waves, introduce the term and prompt them to continue using it as they engage with the content in this lesson.
    - Energy and Matter: Write down at least one example of a case where you know that electromagnetic waves transferred energy from one object to another. Student responses will vary. Possible responses include feeling the warmth of the campfire on my skin, heating something up in a microwave oven, or a plant growing in sunlight."

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

- Materials provide teacher guidance on preparing for student discourse and supporting students in using evidence to construct written and verbal claims. The Educator Supports page of the product website includes guidance for facilitating this process. For example, videos in the Instructional Strategies section of the Educator Supports include various "channels" such as Cites Evidence, Summarizing, Key Ideas and Details, Inference and Predictions, etc.
- Materials provide teacher guidance for student discourse. *The Grades 6-8 Program Guide* explains the use of an icon within lessons that shows when student discourse occurs. For example, within the grade 8 Weather, Climate, and Space unit, the lesson *Observing Hurricane Harvey* guides students to make observations, ask questions, and construct an initial claim about weather phenomena as hurricanes. The Lesson Planning document guides the teacher to have students complete an initial claim and then allow for student discourse. Students form groups of three to five, and each member of the group takes a few minutes to share their initial claim. The teacher then asks the following questions to promote student discourse: "What ideas did you have in common? What changes would you make after sharing your ideas?"
- Materials provide teacher questions for supporting student discourse and the use of evidence in constructing written and verbal claims. Questions push students to use evidence to support

their claims in both written and spoken discourse. Students conduct grade-appropriate academic discussions to analyze data and evidence to build their conceptual understanding of each concept. Across the program, Discussion prompts highlight these opportunities, as well as additional teacher questioning prompts found in the teacher materials. For example, the Lesson Planning document for *Investigating the Second Law,* within the Force, Motion, and Waves unit, provides teachers with discussion prompts for students at four different times in the lesson with the following questions:

  - "Discuss your ideas about the following questions: What are other examples of acceleration you encountered today? What affects how much an object accelerates?
  - Discuss the following with a classmate: How does mass affect acceleration? How does force affect acceleration?
  - Discuss your conclusions from the investigation. How does mass affect acceleration? How does force affect acceleration?
  - Watch the video and discuss the following questions: What equation relates force, mass, and acceleration? How do you calculate the acceleration of a 5 kg box pulled with 10 N of force? How do you calculate the acceleration of a 5 kg box pulled with 20 N of force? What happens to acceleration when net force is zero?"

- Materials provide guidance that teachers can use to provide feedback to students while engaging in discourse. Research-based SOS strategies included in the program expect students to share their ideas with one another as they synthesize and deepen their understanding of the grade-level content. Educator notes provide support for teachers on how to facilitate these strategies. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *Newton's Second Law* guides teachers to use the Take a Walk strategy. "The Talk a Walk strategy empowers students to reflect on what they have learned with their peers. After students complete their responses to a question, have them stand up and find a partner across the room. Set a time and let students share their responses. Have students repeat this process two more times with different partners. Then, ask students to return to their seats and share ideas with which they agreed, disagreed, or that they stood out most to them." Materials include a Misconceptions section for teachers to give feedback to students in response to their discourse.

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

- Materials provide teacher support and guidance to engage students' thinking in various modes of communication throughout the year. Materials provide examples of exemplars of student-written and verbal responses. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *Observing Telescopes for Different Parts of the Electromagnetic Spectrum* directs students to record their observations about the phenomenon and construct an initial explanation. Materials then guide the teacher to: "Have students read the introduction paragraph. Ask students if they are familiar with any of the telescopes mentioned. Have student pairs share any experiences they may have had with telescopes. After they have shared their experiences, ask them if they have ideas about how a telescope works." The students then watch a video about the use of telescopes. Students write down their observations as they watch the video. Students then construct an initial explanation for how telescopes observe the universe. Materials then provide the teacher guidance: "Each student should take a few minutes to share and compare their initial explanation either with a partner or a group. After each student has presented an

explanation, the other students should each write down one question about the explanation and one suggestion for improvement.

- Compare and contrast your explanation with another student's. Use the following questions: What ideas did you have in common? What changes would you make after sharing your ideas?

- After all students have had a chance to share their explanations, they should review the feedback they received and decide if they want to make any revisions. You should inform students that it is also perfectly fine to incorporate ideas from other students' explanations if they like the idea. Let them know that scientists often make use of other scientists' ideas to improve their explanations. Ask a student volunteer to summarize what the class discovered and discussed regarding the phenomenon."

- Materials provide examples of student-created labeled drawings and diagrams. For example, in the grade 8 lesson *Observing Car Collisions*, within the Force, Motion, and Waves unit, materials direct students to "Draw a model to explain what is happening during the car collision. Use arrows to show how the cars are moving." The Lesson Planning document provides teachers with examples of the graphic model with the guidance: "Student models at this point are meant to be a pre-assessment, and all answers should be accepted at this point. They will have opportunities to refine their models later in the concept after they have explored the topics."
- Materials provide teacher support for facilitating the sharing of students' finding solutions. Materials provide feedback tips and examples teachers can use to support students throughout the learning cycle. For each lesson, a teacher-only section on Lesson Planning provides guidance to facilitate student discussions and opportunities for students to share their thinking and analyze data to find solutions and develop explanations. For example, in the grade 8 Force, Motion, and Waves unit, the Lesson Planning document for *Investigating the Second Law* provides the following guidance for the teacher:
  - Before the investigation: "Begin the lesson by having students note things they observed today that either speed up or slow down. They can even include themselves. Ask students to share with a partner what they know about things that accelerate. Have students read the introductory paragraph and discuss the questions with a classmate. Discuss your ideas about the following questions: What are other examples of acceleration you encountered today? What affects how much an object accelerates?"
  - After the investigation: "Help student groups to make sense of the data they collected and what they observed. Discuss your conclusions from the investigation: How does mass affect acceleration? How does force affect acceleration? Have students watch the video and facilitate a discussion to formalize their understanding of the second law of motion. Record notes on board as students discuss the examples."

Discovery Education Science Techbook for Texas Grade 8

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.	PM
2	Materials assess all student expectations over the breadth of the course and indicate which student expectations are being assessed in each assessment.	M
3	Materials include assessments that integrate scientific concepts and science and engineering practices with recurring themes and concepts.	M
4	Materials include assessments that require students to apply knowledge and skills to novel contexts.	M

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some TEKS-aligned and developmentally appropriate assessment tools.

Materials include some diagnostic, formative, and summative assessments to assess student learning in a variety of formats. Materials assess student expectations over the breadth of the course and indicate which student expectations are being assessed in some assessments. Materials include assessments that integrate scientific concepts and science and engineering practices with recurring themes and concepts. 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.

- Science Techbook teachers have access to various assessment tools, including Assessment Builder, which comes with a bank of pre-authored items and the ability for teachers to author their own items. However, materials do not provide teachers with pre-written diagnostic assessments to give at the beginning of the course or prior to a unit to assess students' current understanding and learning gains. Without a diagnostic assessment, it is difficult for teachers to gain a baseline understanding of students' knowledge to compare to the summative assessments to see learning gains.
- Materials include formative assessments in various formats to measure student learning and determine the next steps for instruction. They include open-ended and multiple-choice questions throughout the concepts and units, which all can serve as formative assessment probes. Materials include a “Check Your Understanding” section in each core lesson. This section provides the students with one to two questions to assess their current understanding of the content, with direct feedback to students in the materials’ digital format. For example, within the grade 8 Matter and Properties unit, in the lesson *Investigating States of Matter*, if a student submits the incorrect answer to the question “You have a balloon that changes its shape when it rests on a surface. However, the volume of the balloon always remains the same. What can be concluded about the balloon?” materials provide the feedback, “Not quite. Think about the

differences among the three balloons you tested in the activity." Materials also include a "What Did You Figure Out?" section of certain lessons, designed to help teachers check student understanding at key points during instruction. The Lesson Planning document provides expected student responses.

- Materials include summative assessments in various formats. Materials provide a summative assessment for each concept called the Concept Check-in. The Concept Check-In contains approximately ten questions, and the questions vary in format and difficulty level. For example, the summative assessment for Unit 1, Concept 1: Solids, Liquids, and Gases consists of ten questions, six of which are multiple-choice questions, one short constructed response, one drag and drop, and two hot spots. While materials provide a summative assessment for each Concept, the TEKS are assessed in isolation and not as a unit or semester. Materials do not include a pre-written comprehensive unit assessment to administer to students. Students of this age are capable of and should be exposed to these types of lengthier assessments, as they mirror state testing and various other district-level assessments students may take.
- Materials provide informal opportunities to assess student learning; this occurs during a lesson's Phenomenon Check-In. Students revisit their initial questions using new information they gather throughout the lesson. In the grade 8 Earth and Space Systems unit, the lesson *Types of Tides* guides students to gather information about types of tides. At the end of the lesson, the Phenomenon Check-In guides students, "Now that you have explored tides, revisit the questions you and your classmates came up with on the Student Question Board."

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 of the student expectations, as outlined in the TEKS, by grade level. Materials contain a cohesive scope and sequence that maps out and outlines what TEKS will be taught in a specific course or grade level. Materials clearly indicate alignment in the curriculum for the grade level or subject in a manner that is easily identifiable by the teachers. This information can be accessed in several ways: The *Grades 6-8 Program Guide*, the Table of Contents for each Techbook, and each grade level's landing page includes a link to a full list of the TEKS and which concepts they appear in. At the lesson level, the Teacher Overview page for each concept and each Lesson Planning document lists the TEKS.
- Materials include detailed TEKS-based lesson plans that outline how to teach specific concepts and skills, address specific students' expectations, and provide guidance on how to assess student learning. Materials include TEKS-aligned assessments that align the curriculum standards and student expectations and allow teachers to measure student understanding and mastery of the concepts taught.
- Materials indicate which student expectations are assessed. At the end of each concept, materials include a Concept Summative assessment. Materials list the TEKS being assessed at the top of each assessment and are highlighted in blue after each assessment question.

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

- Materials include assessments that require students to integrate scientific knowledge and science and engineering practices with recurring themes appropriate to the student expectation being assessed. For example, in the grade 8 unit Forces and Energy, the lesson *Investigating*

Types of Forces includes a hands-on activity that provides students with opportunities to demonstrate the integration of scientific concepts and science and engineering practices with recurring themes and concepts through hands-on investigations and experiences. Materials guide students to investigate and identify evidence of different types of forces.

- The Techbook identifies the standards for the scientific concepts, Science and Engineering Practices (SEPs), and Recurring Themes and Concepts (RTCs) that are integrated and assessed in each lesson in the list view on every concept landing page in the course. The default setting for the unit is grid view, which is the preferred view for students, so teachers should be sure to change views to see this information.
- Materials provide summative assessment opportunities in the form of performance tasks through projects called "STEM Project Starter." These projects integrate some of the SEPs and RTCs.
- Materials include assessments requiring students to integrate scientific knowledge and SEPs with recurring themes. In each concept, materials include Elaborate/Extension lessons. These lessons include summative assessments that require students to integrate the SEPs and RTCs with the scientific knowledge they obtained throughout the previous lessons. For example, in the grade 8 Matter and Properties unit, the *STEM Project Starter: Thermal Expansion Joints* lesson provides the teacher with the following overview: "In this STEM project, students complete a summative assessment by examining the use of expansion joints in construction and the failure of those joints. Students observe that increases in average temperature affect more than energy use to keep homes and businesses cool, but also can disrupt the movement of people and materials."

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

- Materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *STEM Project Starter: Trick Shots* provides students with the following prompt: "These billiard balls are set up for the start of a new game. What will happen when a cue ball strikes one of these balls? Engineers and scientists are not the only people who are concerned with forces acting on objects. Other careers, such as stunt people and pool players, also need to use scientific understandings of force and mass to achieve their desired results." Materials then instruct students to watch a video and present them with the following information: "Fred is excited that the coin moved exactly as he intended. What types of forces are at play with the coin? Have you ever played pool or mini-golf? Perhaps you were not sure where to hit the ball to make it go into the correct location. Now is your chance to use math and science knowledge to help you make more accurate predictions of objects' behaviors. With a small group, complete the Marble Collision activity and analyze your data. How can this type of data analysis help you with other real-world problems?" After the students collect data from the Marble Collision interactive, they analyze their data and that of their classmates. Students must apply the knowledge they gained in the unit to complete this summative assessment.
- Materials allow for students to investigate phenomena, record data, analyze data, and use that data in real-world contexts. For example, in the grade 8 Weather, Climate, and Space unit, the lesson *Investigating the Role of Energy in the Water Cycle* guides students to discuss the following questions about the water cycle: "What drives the water cycle? What causes more or less rainfall?" Students then predict how energy transfers through the hydrosphere and the atmosphere and how this energy transfer influences weather and climate. Students complete a

hands-on investigation with provided materials, collecting and organizing data in a data table. Students then create a flow chart illustrating how "a molecule of water makes its way through the water cycle. Include energy in each step." Students then upload for teacher feedback. Materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. Each concept features a STEM Careers lesson that allows students to dive deeper into related content standards as they learn about STEM careers and real-world scientists and engineers that also study the same ideas they just uncovered in their classroom. These lessons have embedded assessment items that drive students to demonstrate the transfer of knowledge. For example, within the grade 8 Force, Motion, and Waves unit, the lesson *Weight on Different Planets* directs students to describe how the laws of motion apply to STEM careers.

Discovery Education Science Techbook for Texas
Grade 8

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	Materials 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. Materials 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.

- Materials include resources that provide guidance for evaluating student responses. The *Grades 6-8 Program Guide* states, "Provided rubrics assist students in developing explanations and models. Students and teachers utilize these rubrics to follow student self-assessments, monitor progress toward mastery, and evaluate final products. The rubrics also provide teachers with a checklist of required ideas or components to help students organize their thinking and ensure they show what they have learned."
- Materials include an Assessment Administration document, located under Course Materials, that provides step-by-step guidelines to instruct teachers how to score digital assessment questions, including rubric-based constructed response questions. Since rubrics are intended to be both student and teacher-facing, they are also found on the student digital page. Each rubric provides specific criteria required for a response to be awarded points.
- Materials include information that guides teachers in evaluating student responses. Materials guide teachers to look for specific components when evaluating student responses. Materials contain the correct answer(s) and/or sample student responses for all discussion prompts, checks for understanding, data analysis, etc., indicated in the magenta-colored text. For example, in the grade 8 Matter and Properties unit, the "Setting the Purpose" section of the

Lesson Planning document for *Investigating States of Matter* guides teachers to ask students three questions. Materials include the following prompts and sample responses: “What things around you are made of matter? Sample response: Everything you can touch is made of matter, including solids, liquids, and gases, such as the air. What is matter? Sample response: Matter is the “stuff” that makes up the world around us. It also takes up space. How do the different states of matter compare? Sample response: Solids keep their size and shape. Liquids can be poured and have no definite shape, but they keep the same volume. Gases have no definite size or shape.”

- Materials include resources that guide teachers in evaluating student responses. In both formative and summative assessment settings, materials provide a rubric for teachers each time a student is asked to respond to a prompt. This rubric can be used to evaluate whether students are rated as on target, making progress, and getting started for each component of the learning objectives and support teachers in evaluating constructed-response style assessment items. For example, within the grade 8 Matter and Properties unit, the lesson *Explaining the Water Cycle* asks students to respond to the prompt, “How does your model explain the phenomenon?” The rubric gives detailed descriptions for each of the rating scales for the following criteria: Describes Phenomenon: the model describes the phenomenon. Fits with Evidence: model uses evidence collected during the unit. Represents Science Ideas: model includes established science ideas. Evaluating Limitations of Model: model includes evaluation of its limitations.

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.

- Materials provide guidance documents and resources to support teachers' analysis of assessment data, teachers' interpretation of the data, and tools to support teachers in responding to data to inform instruction. The Techbook provides several assessment guidance documents, found under Course Materials, to support teachers with use, analysis, and data-driven instructional planning.
- The Lesson and Concept Data Reflection Guidance documents provide teachers with reflection questions for after assessments to analyze the effectiveness of a lesson or unit. The documents guide teachers in how to look at data holistically, by a specific question, at a specific student, or at a specific standard in the summative concept assessments. The documents provide suggestions for how to form groups based on data using the Lesson Assessment Reports. "Consider grouping students into the following groups:
    - 1) students needing remediation or reteaching,
    - 2) students needing repeated practice with a particular component of the learning objective,
    - 3) students needing extension or enrichment, and
    - 4) students who do not need target support at this time in the learning cycle."
- The Assessment Administration Guide, located under Course Materials, provides tips for administering summative assessments, including setting up a productive testing environment and scripts for the teacher. The guide also shows the teacher how to assign assessments, view progress, and score information.

Discovery Education Science Techbook for Texas
Grade 8

Materials 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. Materials include self-reflection questions for teachers to use after analyzing and interpreting data, found under Course Materials in the Lesson and Concept Data Reflection Guidance documents.
- Within the formative assessment items in each concept, materials provide embedded scaffolded feedback that is automatically pushed to students when they select the incorrect answer. There are three rounds of scaffolded feedback that support students' individual needs by providing hints that will guide them toward the correct response.
- Course Materials include documents providing support for teachers in analyzing and interpreting data from the various assessment items in the program. Each document provides a step-by-step process for teachers to follow as they receive results from the lesson and concept assessment. Additionally, materials provide guidance for examining data by question or by student, as well as how to group students based on performance. Descriptions of how teachers can adjust instruction and plan future core instruction for the whole class or to individual students are included along with guidance on identifying and utilizing additional Discovery Education resources to supplement lessons for reteaching, remediation, and enrichment.

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

- Materials provide a variety of teacher guidance for responding to student data. Located under Course Materials, Lesson Data Reflection Guidance and Concept Data Reflection documents provide support for teachers on how to analyze and interpret data from the various types of assessment items in the program. For example, when guiding a teacher to form small groups, materials state, "Whether a teacher is analyzing data for a single item or a set of items in a lesson, it is likely reteaching and remediation may be necessary to meet the needs of individual or groups of students. As teachers review data, they should determine thresholds for scores based on each class that would be most impactful for reteaching, remediation, and enrichment. Use the data in the Lesson Assessment Reports as a data source for analysis."
- Documents in the Course Materials section of the digital product provide a step-by-step process for teachers to follow as they receive results from the lesson and concept assessments. Materials include guidance for examining data by question or by student, as well as how to group students based on performance. Descriptions of how teachers can adjust instruction and plan future core instruction for the whole class or individual students are included, along with guidance on identifying and utilizing additional Discovery Education resources to supplement lessons for reteaching, remediation, and enrichment.
- The Concept Assessment report data can be exported to Excel/CSV format. This allows teachers to manipulate the data to meet their needs, creating custom groupings based on TEKS-targeted groups. For example, the teacher could color-code all the students who correctly scored above a specific threshold on a particular standard in order to create a group for enrichment.

Discovery Education Science Techbook for Texas
Grade 8

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 contain items that are scientifically accurate, avoid bias, and are free from errors. For example, the grade 8 Unit 1, Concept 1, Concept Summative: *Applying the Laws of Motion* contains an age-appropriate assessment that has non-biased and scientifically accurate questions.
- Assessments contain items for the grade level that are scientifically accurate. Formative and summative assessments include assessment items that align with taught objectives and present grade-level content and concepts, science and engineering practices (SEPs), and recurring themes and concepts (RTCs) in a scientifically accurate way. In each concept, materials include Elaborate and Extension lessons. These lessons include summative assessments that require students to integrate the SEPs and RTCs with the scientific knowledge they obtained throughout the previous lessons. For example, in the grade 8 lesson *Mars or Bust! What's the Deal with Wheels in Exploring the Red Planet?* within the Force, Motion, and Waves unit, materials provide the teacher with the following overview: "This STEM project is a summative assessment that requires students to apply their understanding of forces and motion to design improvements for the Martian rover. Have students work in small groups to design their rover. Students should submit their answers individually. To extend the project, have students build a prototype of their design using materials from home. Have each group present its designs to the class. Discuss the effectiveness of each design." However, the teacher materials do not list any TEKS for this assessment task, making identifying the SEPs and RTCs difficult. Without an assessment companion that lists these extensions as summative assessments and identifies the dual and

triple-coded TEKS, identifying these as true 3D assessments proves to be challenging for teachers.

- Throughout materials, assessments contain items for the grade level and course that are error-free. For example, the assessment at the end of the lesson *Weight on Different Planets* within the grade 8 Matter Force, Motion, and Waves unit asks students to complete a data table: "Find your mass in kilograms by dividing your weight in pounds by 2.20. Then, use the equation F = mg to calculate your weight in newtons on each planet." Materials provide answers that are accurate and use the correct units.

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

- Materials provide assessment tools that use clear pictures and graphics. In the grade 8 lesson *Primary and Secondary Succession*, within the Cells, Genes, and Ecosystem Changes unit, students learn about primary and secondary succession through watching videos and reading articles. The pictures associated with the article are clear and concise.
- Materials provide assessment tools that use clear pictures and graphics that support student learning of the concept. For example, within the grade 8 unit Force, Motion, and Waves, the lesson *Investigating Laws of Motion* contains a video of a bicycle, a video about the laws of motion, an image of part of the lab procedure, and an image of a couple ice skating. All of these images are clear, age-appropriate, and help build conceptual understanding.
- Materials provide assessments that have pictures and graphics that are developmentally appropriate. For example, the grade 8 *Concept Summative: Investigating Waves,* within the Force, Motion, and Waves unit, provides a clear graphic of the electromagnetic spectrum. The image is clear and age-appropriate. The magnifying feature allows images to be enlarged for ease of viewing.

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

- Materials provide guidance for teachers to consistently and accurately administer assessment tools. Materials provide both general and specific guides that discuss the assessment program. For a general overview, the *Grades 6-8 Program Guide* provides an overview of the assessment tools provided. “Science Techbook provides several formative and summative assessment opportunities, carefully embedded in the cycle of learning to help teachers guide their students to mastery of key learning targets and objectives. These assessment opportunities allow teachers and students to monitor progress and provide direct practice with STAAR-like item types across various assessment formats.” Additionally, materials provide an Assessment Guide that supports the teacher in understanding the types of formal and informal assessment tools included in the curriculum. "Science Techbook for Texas includes a variety of assessment opportunities, including Lesson assessments (formative) and Concept assessments (summative), as well as additional practice items and tools." The document explains the icons used and the different types of lesson assessments that can be seen throughout each grade level. Materials include a guide, the Teacher, Caregiver, and Administrator Guide to Product Reports, that provides more specific support in describing an overview of the types of assessment data, with directions on how to access each report. This document supports the teacher’s understanding of the various features that serve as tools to analyze data, as well as concept and lesson reports that provide scores in easy-to-understand views.

- The Lesson Data Reflection and Concept Data Reflection document provides guidance and support for teachers on how to analyze and interpret their data. The document includes reflection questions for teachers to consider throughout the process in order to make insights based on patterns or trends in the data to better understand student performance. Additionally, materials provide guidance for examining data by question or by student, as well as how to group students based on performance. These documents include descriptions of how teachers can adjust instruction and plan future core instruction for the whole class or individual students, along with guidance on how to identify and utilize additional Discovery Education resources to supplement lessons for reteaching, remediation, and enrichment.
- The Assessment Administration document provides detailed guidance on how to administer assessments, starting with how to assign assessments to a class or group of students. It also includes guidelines for administering the summative assessments and how to score constructed response questions in both the lesson and summative assessments. Additionally, the document includes a script to be used during test administration.

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

- Materials offer accommodations for assessments and lesson tools so that students of all abilities can demonstrate mastery of learning goals. Materials include accessibility tools such as text-to-speech, highlighting, and closed-captioning built into the digital platform to allow students to access content and demonstrate their learning. For example, in the grade 6 lesson Solids, Liquids, and Gases, within the Matter and Properties unit, students can turn on closed-captioning in the video.
- Materials allow students to double-click on words or phrases in the lesson assessments to have them read aloud. Lesson assessments also include the ability to enlarge images, translate using browser technology, and printable sheets for items.
- The Assessment Accommodations guidance document, located under Course Materials, provides additional support to teachers, parents, and administrators describing available accommodations or strategies for assessment accommodations. This document provides detailed information of each accommodation available within the assessment experience, including how to provide separate, detailed instructions to groups and individuals. Additionally, this document provides step-by-step guidance on creating additional practice assessments or alternate forms of assessments.
- The Assessment Accommodations guidance document explains how teachers can give instructions in English or Spanish and how they can print and give assessments to students that need paper-based assessments. The document also includes instructions about how to develop different assessments if needed to accommodate different learners

Discovery Education Science Techbook for Texas Grade 8

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 grade-level mastery.	PM
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

Partial Meets | Score 1/2

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

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

- Materials include teacher guidance for scaffolding instruction and differentiating activities for students who have not yet achieved mastery. In each Concept, the Lesson Planning document provides suggested activities to scaffold learning for students who need additional support in the "Approaching Learner" sections. For example, in the grade 8 lesson *Changes of States*, within the Matter and Properties unit, materials provide the following guidance: "If students struggle, encourage them to spend extra time in the interactive, either by themselves or with a partner. Have students describe the changes they observe in the molecules of water, first when the water is heated and then when it is cooled. They should recognize that the molecules do not break into atoms or rearrange to form new molecules. Instead, they move faster and eventually separate when they are heated, and they move slower and eventually vibrate in place when they are cooled."
- Materials do not include ample resources to ensure that teachers can target instruction to develop precursor skills necessary to access grade-level content. For example, materials do not contain additional lessons for small group instruction that are based on students' areas of need. Materials do not include scientific texts at different reading levels for independent or guided small-group instruction. Materials also do not include a variety of student activities that can be assigned to reteach, review, and practice skills for students who need additional support for mastering course-level science concepts and skills.
- Materials do not provide additional resources for targeted instruction and differentiation to support students who have not yet achieved mastery. Materials lack additional reteaching

materials for intervention purposes to support students who may still not have achieved mastery after instruction or the end of Concept summative assessments. Materials provide no explicit resources to support additional small-group instruction.

- While the Discovery Education platform includes various activities, such as virtual field trips, videos, and activities, these additional resources are not integrated into the digital techbook. These additional resources should be integrated into the digital techbook rather than linked to an external platform.

Materials provide enrichment activities for all levels of learners.

- Materials provide enrichment activities that account for learner variability. Teacher guidance and resources encourage the exploration and application of grade-level science knowledge and skills in a variety of ways. Materials provide a variety of resources for students to construct new knowledge. These include text, video, simulations, scientific investigations, and engineering challenges. All lessons on all concepts in each unit provide at least some of these opportunities. For example, in the grade 8 concept *Investigating Waves*, within the Force, Motion, and Waves unit, the first four lessons provide opportunities for students to observe and record an investigation, discuss with peers, write their predictions, and record observations. Materials also provide students with videos to watch and scientific texts to read.
- Materials utilize the 5E model to deliver instruction and enrichment activities to all levels of learners. In each concept, the Elaborate section offers an extension of learning for all students through investigations into STEM careers or STEM in Action. For example, in the *STEM: Project Starter: Color of a Star* lesson within the grade 8 Weather, Climate, and Space unit, materials ask students to use their science knowledge on the temperature and color of stars to explain why blue stars are the hottest. Students explain what information scientists receive from a spectroscope on a telescope. Once complete, students apply this knowledge to a fluorescent light bulb, an incandescent light bulb, and a candle. Students finish this extension activity by describing the essentials that they would need to build their own spectroscope to analyze the light emitted by distant stars.
- Materials include guidance to regularly engage in tasks such as writing prompts and small group or partner discussion for responding to lessons in a variety of ways. For example, in the grade 8 Matter and Reactions unit, the lesson *Explaining Water Strider*s asks students to revise their explanation of a phenomenon they engaged in the first lesson. “Now that you have learned more about the properties of water, write a final explanation about how water strider insects are able to walk on water.” In the lesson *Classifying Substances and Mixtures*, within the same unit, materials provide students with numerous prompts to discuss with small groups such as “How are compounds and elements similar and different? What distinguishes pure substances from mixtures? What is the difference between a colloid and a suspension? How are the different types of mixtures classified?”

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

- Materials include recommendations for just-in-time scaffolds to develop productive perseverance in learning at the moment. For example, in the grade 8 lesson *On Your Wavelength*, within the Force, Motion, and Waves unit, students analyze how wave properties relate to color. Students use an interactive simulation to explore the relationship between wavelength and frequency in visible light waves. Materials provided the teacher with guidance

and procedures for the students to complete the investigation individually, in small groups, or teacher-led. Materials provide the teacher with suggested questions to ask the students to engage the students in the task, such as “What is the objective of the interactive? What are the units for wavelength and how small are these values? What are the units for frequency? How large is 1014? What pattern do you see between wavelength and frequency?”

- Materials include prompts and cues for learners when they are stuck on a particular task or unsure how to proceed. The Science Techbook for Texas – Grade 8 provides suggested activities to scaffold learning for students who need additional support in the “Approaching Learners” section of the Lesson Planning documents. For example, within the Cells, Genes, and Ecosystem Changes unit, the Lesson Planning document for *Investigating Punnett Squares* provides teacher guidance if students do not understand. "If students struggle, return to the table of genotypes and traits. Help students understand what the capital P and the lowercase p stand for. If necessary, underline the capital P so it is easier to differentiate from the lowercase p. Then have students use their own words to describe what a dominant allele is." The lesson then encourages students to go back and revise their work. Materials do not just give students the answer, instead, they provide students with more information to encourage productive struggle.
- Materials provide extra resources for students who are ready to extend their learning. For example, the Science Techbook for Texas – Grade 8 includes Elaborate lessons within each Concept that allow these students to extend their knowledge and apply new knowledge to new situations. For example, after learning about the carbon cycle in the Impacts on Climate concept within the Weather, Climate, and Space unit, an Elaborate lesson *Careers and Climate* includes text and an image, then guides students to “describe how ideas about impacts on climate apply to STEM careers.”
- Materials provide support and resources for students who are ready to accelerate their learning. In each concept, materials provide suggested activities to extend learning for students who are ready for acceleration, located in the “Advanced Learners” section of the Lesson Planning documents. For example, in the grade 8 lesson *On Your Wavelength*, within the Force, Motion, and Waves unit, the “Advanced Learners” section states: “Challenge advanced learners to explore an interesting relationship between the speed of a wave, its wavelength, and its frequency. Let students know that wave speed (s) is equal to wavelength (λ) times frequency. Convert all nanometers to meters by moving the decimal nine places to the left. Convert all frequencies into whole numbers by moving the decimal point 14 places to the right. Have them use a calculator or computer to calculate the speed of each color of light in the visible spectrum. Then state a conclusion about the speed of electromagnetic waves. They should find that all colors travel close to 300,000,000 m/s, or the speed of light.”

Discovery Education Science Techbook for Texas
Grade 8

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 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 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 mastery of the content through a variety of developmentally appropriate instructional approaches. Materials include a variety of lesson types in each concept from hands-on investigations, to interactive model lessons, to media and literacy lessons, for the purpose of gathering evidence to tie back to the real-world phenomenon in the Engage section of the lesson. These varied learning experiences deepen students' understanding, allow students to demonstrate scientific and engineering practices, and require students to think about recurring themes and concepts. For example, in the grade 8 Force, Motion, and Waves unit, Concept 1: Applying the Laws of Motion, materials provide the following guidance:
    - Lesson 2: *Investigating the Second Law*, students investigate how force and mass affect acceleration, by participating in a hands-on activity.
    - Lesson 3: *Newton's Second Law,* explain how force, mass, and acceleration are related by gathering information by reading scientific texts and watching videos.
    - Lesson 4: *Investigating the Laws of Motion*, students use a model to investigate the laws of motion in a system by participating in a hands-on activity.

- Materials include clear guidance to support teacher understanding of developmentally appropriate instructional strategies. The Educator Supports section includes an Instructional Strategies section that provides teachers with knowledge of implementing research-based instructional strategies throughout the lessons.
- Materials include clear guidance to support teacher understanding of developmentally appropriate instructional strategies designed to engage students in content mastery. Embedded in lessons across each concept, materials provide Spotlight on Strategies (SOS) videos for the teachers. These research-based strategies help engage students and expect them to analyze information and share their thinking with their peers to refine their ideas. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *Speed and Velocity* includes an SOS video and a text description of the strategy that provides the teacher guidance on an instructional activity called Quick Write. "Quick Write: Quick writes are a simple literacy strategy used to develop writing fluency, build the habit of reflection into a learning experience, and informally assess student thinking. In this variation of the strategy, allow students to read the question prompt and discuss their ideas with a partner or their group. Then, have students individually record their responses in their own words within the time allotted. Allow students to compare and revise their responses based on peer feedback."
- Materials include concept maps to help engage students in the lessons. In the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Primary and Secondary Succession* guides students to learn about the similarities and differences between primary and secondary succession that occur after a disruption in ecosystems. At the end of the lesson, students take what they have learned about primary and secondary succession and compare and contrast using a Venn Diagram.

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

- Materials support a variety of instructional groupings (e.g., whole group, small group, partners, one-on-one). There are activities in each concept that allow for such groupings. For example, in the grade 8 lesson *Observing the Water Cycle*, within the Matter and Properties unit, materials provide the following guidance for the teacher. "Have students form small groups of three to four students. Each student in the group should take a few minutes to share their initial model and explanation. After each student has presented his or her model, the other students should each write down one question about the explanation and model and one suggestion for improvement."
- Materials guide teachers on when to use specific grouping structures such as Think-Pair-Share. Within the grade 8 Cells, Ecosystems, and Variation unit, the lesson *Investigating Interactions in Ecosystems* provides student guidance. "Discuss the following questions with a classmate: How would you describe the relationship between birds and flowers? What happens if two species in an area depend on the same resources?"
- Materials guide teachers on when to use specific grouping structures based on the needs of students. At key points throughout the learning cycle, the Lesson Planning documents provide the teacher suggestions on grouping students based on student's needs, interests, or preferences. These teacher materials also include differentiation strategies for advanced learners, approaching learners, etc.

Discovery Education Science Techbook for Texas
Grade 8

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

- Materials provide multiple types of practices (e.g., modeled, guided, collaborative, independent). For example, in the Global Patterns Concept of the grade 8 Weather, Climate, and Space Unit, students observe a phenomenon as a class in the Engage lesson and have a whole class discussion as their teacher leads it. They work in collaborative groups to conduct investigations and make sense of models (physical and pictorial models and animations of differential heating of the Earth's surface, convection currents in the atmosphere, and high and low-pressure systems.) They work independently on answering questions in the "Check for Understanding" section of each Explore lesson and the "Review" section of each Evaluate lesson.
- Lessons include teacher moderation of student working groups to engage in scientific discussions and debates. In the grade 8 Cells, Genes, and Ecosystem Changes unit, the lesson *Investigating Punnett Squares* includes guidance in the Lesson Planning document for teachers in supporting students in investigating how traits are passed down from parents to offspring. Materials guide teachers to "Circulate while students observe and record to assess and push student thinking." Ask: Which type of ears are dominant? How is a dominant pointy-eared allele indicated?”
- Materials provide teacher guidance and structures for effectively implementing multiple types of practices. There is detailed guidance in the Lesson Planning document for each lesson. For example, in the lesson *Observing Hurricane Harvey* within the Weather, Climate, and Space unit, materials explain how to set the purpose of learning in this concept, how to collect student observations and questions about the anchoring phenomenon, how to construct a driving questions board, how to make connections to recurring themes and concepts, and how to support students to create initial models to explain the phenomenon. This helps create engagement and helps teachers to elicit students' prior knowledge.
- Materials provide a clear purpose and learning goals for the group and independent practice activities contained in units and lessons. For example, in the Cells, Genes, and Ecosystem Changes unit, the lesson *Food Web Disruption* provides students with specific goals in each section of the lesson. Materials provide a text for students to read and a goal for the activity. "As you read, highlight or underline new ideas that help you explain how disruptions impact energy transfer and populations in food webs." The lesson then provides students with the guidance "Complete the activities to refine your understanding of ecosystem and food web disruption." Materials also provide teacher guidance within the Lesson Planning document. "Ask students to highlight or underline ideas that help them explain ecosystem disruptions as they read. To support engagement and comprehension, stop at designated points in the text."

Materials represent diverse communities in the images and information about people and places.

- Materials represent diverse communities using images and information that are respectful and inclusive. Images reflect the diversity of school communities and match the content. Characteristics vary in images to include race and ethnicity, skin tone, gender identity and expression, age, disability status, body size and shape, and hair texture. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *Review: Applying the Laws of Motion* includes an image of students in a classroom that reflects the diversity of school communities. The names presented in the assessments equally include male and female names; they also represent diverse backgrounds.

- Materials represent diverse communities. The *Grades 6-8 Program Guide* includes images of students and teachers of different races, and there is a similar ratio of boys to girls pictured in the guide.
- Materials represent diverse communities using images and information that are respectful and inclusive. STEM careers lessons allow for students to further explore areas of interest beyond the classroom and consider career pathways related to core scientific ideas. These lessons allow students to see themselves as valuable contributors to the larger community.

Discovery Education Science Techbook for Texas Grade 8

Indicator 7.3

Materials include listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting grade-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.	PM

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting grade-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 some 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 linguistic accommodations commensurate with various levels of English language proficiency as defined by the English Language Proficiency Standards (ELPS.) The Lesson Planning document for most lessons includes guidance for teachers for Beginning, Intermediate, Advanced and Advanced High English proficiency levels. These lessons provide scaffolding suggestions for each of these proficiency levels when students are listening, reading, speaking or writing. For example, in the grade 8 lesson *Investigating the Second Law* within the Force, Motion, and Waves unit, the document provides the following English language proficiency support:
    - "Beginning: Check for understanding of vocabulary including constant, variable, mass, acceleration, and force. If your students speak Spanish, remind them to look for any of the words that are similar to words in Spanish since most of these words are Spanish cognates. Read the directions to students as you model the process. Stop to be sure that students understand the directions including the verb to thread. Then have students read the directions again with a partner before beginning the investigation. Have students use the notes in their data tables and the sentence frames to describe what they observed.
        - To increase mass, we added _____ to the straw. The more mass we added, the _____ the balloon accelerated.

        - To increase force, we _____ the size of the balloon. The more force on the balloon, the _____ the balloon accelerated.

    Finally, have students read their sentences aloud.
    - Intermediate: Check for understanding of vocabulary, including constant, variable, mass, acceleration, and force. If your students speak Spanish, remind them to look for any of the words that are similar to words in Spanish since most of these words are Spanish cognates. Have students examine their data table. Read the directions to the investigation to students or have them read the directions with a partner. Stop to be sure that they understand the verb to thread before they begin the investigation. Then have students use their table to describe how mass and force affect acceleration. Allow students to use the following sentence starters or their own words to share their ideas with the class. According to my data table, to increase mass, we . . . . We learned that . . . . To increase force, we . . . . We learned that . . . .
    - Advanced: Allow students to read the directions to the investigation with a partner. Remind them to use context clues and cognates to help them to understand the directions. Have students note key ideas from the activity. Then, have students work with a partner to describe the interactions between force, mass, and acceleration. Students should record their answers and report to the class. One partner should serve as recorder and one as a reporter.
    - Advanced High: Remind students to use context clues and cognates to help them to understand the directions. Have students note key ideas from the activity. Then have students discuss with a partner how mass and force affect acceleration. After the partner discussion, have students share key ideas with the class."
- Materials include linguistic accommodations commensurate with various levels of English language proficiency as defined by the ELPS. The materials embed scaffolds for emergent bilingual (EB) students into lessons, such as visuals, gestures, sentence stems, graphic organizers, anchor charts, and manipulatives. For example, within the grade 8 Force, Motion, and Waves unit, the Lesson Planning document for *Newton's Three Laws of Motion* provides the following guidance: "English Language Learners: Preview discussion questions prior to each section of the reading. Provide sentence frames for students to use when participating in the discussion. Be sure to allow extra time for students to process the language they will need to express their ideas. Newton's first and second laws are similar because they both describe _____. Newton's third law focuses on _____. Consider having students choose to explain how the three laws apply to holding a book or during a basketball jump shot."
- Materials suggest the use of graphic organizers to classify information. In the grade 8 lesson *Make it Rain*, within the Weather, Climate, and Space unit, the materials guide teachers in supporting EB students to complete a graphic organizer. "English Language Learners: Provide students with a modified pyramid graphic organizer, including at least one sentence frame in each row. The sentence frames may include the following: Top row: Interactions between different types of air masses produce _____. Middle row: Warmer air is _____ than colder air, so warm air masses _____. Bottom row: Knowing how different air masses interact can help _____."

Discovery Education Science Techbook for Texas Grade 8

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

- Materials encourage very little strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English. The Teacher Overview Lesson Planning section for each concept includes a section on the Spanish cognates for the vocabulary words. For example, in the grade 8 Matter and Solutions unit, Concept 1 lists the Spanish cognates: átomo, masa, molécula, precipitado, reacción química, reactividad, sustancia. Student materials include a glossary or text boxes, however, these definitions do not include cognates or definitions in second languages (i.e., Spanish).
- A few of the videos in the glossary do include closed captioning in Spanish, but the animations do not include any language supports. Some interactives in the Techbook can be accessed in different languages, however, it is inconsistent. For example, the grade 8 lesson *Life on the Edge*, in the Life Systems and Processes unit, includes an interactive that can be viewed in English or Spanish, while the interactive within the lesson *Carbon Cycle*, found within the same unit, can only be viewed in English. Materials lack a resource for teachers to have an overview of the specific language supports for each language that is available for each concept.
- Materials do not have other supports that encourage strategic use of students' first language for linguistic, affective, cognitive, and academic development in English. For example, materials do not include:
    - Support for teachers about how and why to promote and build first language proficiency.
    - Tips for teachers about the importance of allowing students to express their understanding in their first language and practical suggestions for teachers who do not speak the student's first language.
    - Family letters explaining the instructional objectives and/or homework in languages other than English.
    - Links to resources for translation or support in first languages.
    - Textbooks or audio/video clips that explain concepts in languages other than English.
- Materials include brief information about language transfer in The *Grades 6-8 Program Guide,* however, more in-depth instructions are only available as what seems like an additional paid resource, Experience Level resources. Additionally, the "English Language Learner Center" portion of the product website is not available for reviewers to access.

Discovery Education Science Techbook for Texas
Grade 8

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 some 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 information to share with caregivers about the design of the program. Materials provide caregivers with a Parent/Guardian Letter describing how to access the program and how the design of the program supports students to act and think like scientists and engineers.
- Materials provide information to share with students about the design of the program. Materials provide students with a letter describing the program. “These resources will help you make observations, analyze, and interpret data to figure out real-world phenomena. You will solve problems, make connections between science and the world around you, and explore questions you have about science.”
- Materials provide information to share with caregivers in the Caregiver Course Overview. “Your child’s teacher is using Discovery Education in their classroom to help your child master key scientific concepts and act and think like a scientist. Your student can sign in anytime to engage with exciting digital activities and resources across a variety of subjects, grades, and topics of interest. Students engage with interactive science instruction to analyze and interpret data, think critically, solve problems, and make connections across science disciplines. In addition, they experience dynamic content, explorations, videos, digital tools, hands-on activities and labs, and game-like activities that inspire and motivate scientific learning and curiosity.”

Discovery Education Science Techbook for Texas
Grade 8

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

- Materials provide resources and strategies for caregivers to help reinforce student learning and development. The Caregiver Course Overview includes for each unit a Unit Summary, Key Vocabulary, and descriptions of the Unit Phenomenon. “More details on what we are exploring, along with some suggested ways you can support student curiosity at home, are provided for each unit. Allowing students to make observations of the world around them encourages them to continue to ask questions about the real-world phenomenon we are uncovering in each unit.”
- The Caregiver Course Overview includes "Conversation Starters" for caregivers, which provide questions they can ask their students to talk about the topics at home.
- Materials provide at-home practice activities for caregivers to help reinforce student learning and development. The "Home Connections" section of the Caregiver Course Overview provides activities for parents to do at home to reinforce their learning at school.

Materials include information to guide teacher communications with caregivers.

- Materials include teacher guidance for communicating with caretakers. The Caregiver Course Overview positions caregivers as partners in the learning cycle in the classroom. "The overview provides caregivers with details on the science topics students are exploring, creative ways to support their curiosity, and conversation starters to keep the science discussions going at home." It includes a Unit Summary, Key Vocabulary, and descriptions of the Unit Phenomenon.
- Materials guide teachers to communicate with caregivers and suggest when and what to communicate. Materials guide teachers to communicate often, using easily downloaded files for each student that can also be translated as needed.
- The Caregiver Course Overview includes screenshots for teachers to see what caregivers view when following student progress. Teachers can use this to guide caretakers' involvement in their student's education. "Consider capturing a screenshot of the student’s assignment dashboard and sending it out to caregivers on a monthly basis to keep them updated on their progress. The lesson and concept summative reports can be used for face-to-face, or virtual conferences with parents to display student proficiency toward the desired learning goals."

The publisher should include the additional resources (Discovery Education Family Resource page and Discovery Education Guide for Families) within the digital techbook rather than linking to an external platform.

Discovery Education Science Techbook for Texas Grade 8

Indicator 8.1 Grade 8

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, scientific and engineering practices, and recurring themes and concepts.	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, scientific and engineering practices, and recurring themes and concepts. Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.

Evidence includes but is not limited to:

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

- The materials include a year-long scope and sequence found in the Grades 6–8 Program Guide. The “Grade 8 Scope and Sequence” section breaks down the material by unit and concept titles and their alignment to the Texas Essential Knowledge and Skills (TEKS) and the English Language Proficiency Standards (ELPS). This section includes a general pacing guide that shows what order to teach the material.
- Grade levels are organized by courses. In the grade 8 course, there is a link to “TEKS Alignment.” Within this subsection, all TEKS are listed sequentially and include which concept titles incorporate each of the TEKS.
- A “Table of Contents,” found in the grade 8 course, breaks down each unit by lesson. The “Table of Contents” also shows TEKS alignment for each unit, including pacing. Teachers can review where each of the TEKS is revisited throughout the year by clicking on the links provided in the “Table of Contents.”
- Each grade 8 unit includes “Unit Resources,” which includes a Standards Alignment section for both the TEKS and ELPS. The “Unit Resources” also include a Unit Structure and Pacing section that contains a daily pacing guide with recommended minutes for each unit and an accelerated pacing guide.

Discovery Education Science Techbook for Texas Grade 8

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

- Teacher guidance materials explain connections across core concepts, Scientific and Engineering Practices (SEPs), and Recurring Themes and Concepts (RTCs). These are referenced and defined in the Grades 6–8 Program Guide, which includes a data table that shows how the core concepts are vertically aligned across grades 6–8.
- The Grades 6–8 Program Guide instructs the teacher on the integration of the core concepts, SEPs, and RTCs. The Program Guide states, "The scientific and engineering practices, recurring science themes, and core scientific concepts are not intended to be learned in isolation. Instead, students develop an understanding of core scientific concepts best when they are engaged in scientific and engineering practices, and students learn scientific and engineering practices best when they use them to develop an understanding of core science concepts. By actually engaging as scientists or engineers, students are able to build conceptual understanding through direct observations and interactions, which solidifies and deepens their comprehension of scientific core concepts." It also includes guidance for facilitating questioning, ameliorating group dynamics, and conducting investigations.
- The materials are written in the 5E format. In Engage, the materials explicitly guide students to use the lens of a focus recurring theme as they investigate evidence throughout Explore and document their new learning and evidence in Explain. Phenomenon Check-Ins throughout Explore allow students to make connections across three dimensions as they figure out the phenomenon introduced in Engage. The robust lesson-level teacher support includes targeted discussion prompts, sample models with annotations related to the RTC and content connections, and strategies for students to make connections across all three dimensions. The materials include a lesson plan for each concept. This plan guides the facilitation of the lesson and may provide details on the facilitation of the SEPs and RTCs within that lesson. The lesson plans also include targeted discussion prompts, sample models with annotations related to the RTC and content connections, and strategies for students to make connections across all three dimensions.

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

- The materials intentionally spiral previously taught knowledge and skills throughout the year. The Grades 6–8 Program Guide provides a list of how SEPs and RTCs are spiraled throughout the year. The core concepts are included in the summative assessments at the end of each unit.
- Across each course of the middle school program, summative assessments in each concept consist of two to three-dimensional items that allow for repeated practice and student demonstration of mastery across the SEPs and RTCs. This allows students multiple opportunities for practice and performance of these components across a course, in addition to opportunities within the other portions of the 5E instructional design of each concept. Each item was written directly to the TEKS, including connections to the SEPs and RTCs, and teachers can use the resulting data to gather data related to needs for retention and mastery.
- Across each course, the materials contain specific content standards within each unit; however, the units are sequenced in each course to build the foundational scientific understandings necessary to achieve the identified core content standards. For example, in grade 8, the materials first introduce students to the core idea of the electromagnetic spectrum in Unit 1,

"Force, Motion, and Waves." Students return to this core idea later in the course again in Unit 3, "Weather, Climate, and Space," in the extension STEM Project, Color a Star.

- Materials include opportunities for teachers to check for understanding embedded throughout each lesson. In the Checks for Understanding sections, "students engage in a series of quick digital or print assessments directly tied to the standards of the lesson to demonstrate their understanding related to the targeted portion of the standard." At the end of each lesson, there is a review section, What Did You Figure Out?, that allows students to discuss what they have learned in the concept with their peers in various activities such as a quick exit ticket or Turn and Talk.

Discovery Education Science Techbook for Texas
Grade 8

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 grade level.	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 grade-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 grade level. Materials include a comprehensive list of all equipment and supplies needed to support instructional activities. Materials include guidance for safety practices, including the grade-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 include overview documents to support teachers in understanding how to use all materials and resources as intended. The materials provide teacher guidance in using the resources at different levels of the product: course level, unit level, concept level, and lesson level.
- At the course level, the Grades 6–8 Program Guide provides teachers with clear guidance on how the materials support student discourse and how teachers can effectively facilitate student-led discussions. The Grades 6–8 Program Guide further breaks down the materials by unit level, providing clear guidance for the teacher on how to use the Unit Planner.
- The Lesson Plans found within each Concept provide teacher guidance and recommendations for the use of technology. For example, in a grade 8 lesson, “STEM Project Starter: Building Cell City,” within a unit on Cell Function, the materials contain criteria (a rubric) listed under the tab “What is the Scale of Your Model?”

- The materials provide scaffolds to support and enhance students' learning. For example, in a grade 8 lesson, “Evidence of Wave Characteristics,” the materials provide the teacher with differentiation strategies for assisting Emergent Bilingual students. The materials include an English Language Proficiency Support chart that outlines specific support strategies for students at the beginning through the advanced high level. The teacher overview section of the Lesson Plan includes Spanish cognates.
- The Discovery Science Techbook organizes the materials in a way that facilitates ease of implementation and use, including videos on how to implement research-based instructional strategies. For example, in a grade 8 lesson, “Evidence of Wave Characteristics,” the materials provide the teacher with an instructional video on how to facilitate the “Concept Circles” instructional strategy. Some embedded resources, such as graphing calculators and whiteboards, include video instructions.

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

- The materials include standards correlations in multiple places for the teacher, including an overview for the year in the “Scope and Sequence” located in The Grades 6–8 Program Guide and in the Table of Contents on the homepage of the Techbooks.
- Science Techbook for Texas was designed to support Texas ELA and Math standards. The publisher provides the alignment chart in Course Materials on the home course page. Each concept found in the course aligns with a subset of ELA standards across the Engage, Explore literacy, and Explain lessons in each concept. In every concept, students are speaking, writing, and listening to support comprehension of science content. The embedded discussion prompts drive students to engage in meaningful discourse and practice active listening while developing their ability to contribute relevant information to collaborative discussions. The variety of text types in the program provides students with opportunities to deepen their comprehension of complex texts. The embedded interactive glossary tool allows students to validate their understanding of science vocabulary. Specific grade 8 math standards align with lessons included in the Science Techbook for Texas, Grade 8 course. Throughout the program, students apply mathematics to everyday problems, use mathematical problem-solving to make sense of scientific phenomena, and communicate mathematical ideas and reasoning using a variety of different representations.
- The materials include science standards (TEKS) and English Language Proficiency Standards (ELPS) correlations at the unit and lesson levels. For example, in a grade 8 unit about “Air Masses and Local Weather,” the Unit Planner lists the TEKS and ELPS by science concept. The Unit Resources section also includes a Standards Alignment document that lists the TEKS and ELPS by concept and lesson.

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

- The materials include a list of equipment and supplies needed at the unit level. This list can be found in the Unit Resources section of the Discovery Ed Techbook. The resource, which is titled “Hands-on Lessons: Preparation and Materials,” provides a comprehensive list of all equipment and supplies needed to support students and teachers throughout the entire unit. The resource also includes guidance for the teacher on advanced preparation.

Discovery Education Science Techbook for Texas
Grade 8

- Each lesson includes additional materials and resources in the “Lesson Planning” document. Some of these resources contain a “Materials List, Safety, and Preparation” document necessary for each lesson. For example, in the grade 8 lesson “Investigating the Second Law,” the section of the lesson plan titled “Materials List” details the equipment and supplies needed for the students and teacher in the lesson.
- Science Techbook for Texas includes a comprehensive list, found in the Course Materials, that includes all the necessary equipment and materials for the successful implementation of this course. This spreadsheet breaks down the entire year by Unit, Concept, and activity title. The Comprehensive Materials List breaks down the materials by how many student groups it provides for (eight), the quantity of materials necessary for the whole class, or if it is intended for a teacher demonstration.

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

- The materials provide teacher guidance for safety practices and grade-appropriate use of safety equipment during investigations. For example, in a grade 8 lesson, “Investigating the Second Law,” materials include an investigation of Newton's Second Law of Motion. Materials instruct the teacher as follows:
    - Remind students to follow all lab safety guidelines, including the following:
    - Wear proper safety attire as needed for the materials being used.
    - Tie back long hair.
    - Remember not to eat or drink anything in the lab.
    - Wear protective eyewear.
- The materials provide similar student guidance for safety practices and grade-appropriate use of safety equipment during investigations. For example, in a grade 8 lesson, “Investigating the Second Law,” materials include an investigation of Newton's Second Law of Motion. Materials instruct the students to “Follow all lab safety guidelines. Refer to the safety guidelines posted in your classroom. Wear proper safety attire as needed for the materials being used. Tie back long hair, and remember not to eat or drink anything in the lab. Wear protective eyewear.”
- In the grade 8 level techbook, there is a Course Materials link. The Course Materials include a document titled “Safety in the Science Classroom.” This document provides guidelines for the students: “Following common safety practices is the first rule of any laboratory or field scientific investigation.” The document includes sections titled Dress for Safety, Be Prepared for Accidents, and Practice Safe Behavior. Each section includes more guidance for students to follow that is grade-appropriate.

Discovery Education Science Techbook for Texas Grade 8

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 Discovery Science Techbook includes guidance and recommendations on the required time for lessons. For example, the Table of Contents details the estimated minutes of each lesson for each concept for the entire year.
- The materials include guidance and recommendations on the required time for learning activities within lessons. Within each lesson, the materials guide the timing for each learning activity. Each lesson plan includes detailed time stamps for the teacher.
- These materials include suggested pacing in two different ways (comprehensive and express) that are focused on schedules based on 45-minute lessons. There are built-in opportunities for extension for students who need an additional level of support.

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

- The materials include guidance on strategic implementation that ensures the sequence of content is taught in an order consistent with the developmental progression of science but also provides flexibility for districts. For example, the Grades 6–8 Program Guide describes the core structure of the program: “The program is organized into standards-aligned cohesive units that can be arranged in various sequences to meet your district’s needs. Each unit includes concepts that are strategically bundled, ensuring students will uncover all core scientific content. Concepts within each unit are structured with lessons that follow the 5E Framework: Engage, Explore, Explain, Elaborate, and Evaluate. Units, concepts, and 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 materials provide numerous extensions and hands-on activities.

- The materials include guidance on strategic implementation that ensures the sequence of content is taught in an order consistent with the developmental progression of science. The Unit Summary, located in the Unit Planner, details the flow and interconnectedness of the concepts taught within the unit.
- Units include concepts that are strategically bundled. The materials clearly delineate the order of units to ensure students learn about precursor concepts first. For example, in grade 8, the materials have students investigate the role of energy in the water cycle before learning about winds, convection, and hurricanes.

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

- The materials include units, lessons, and activities for a full year of instruction. For example, the Comprehensive Concept Pathway included in each Unit Structure and Pacing Guide provides evidence that the materials include lessons and activities for a full year of instruction. The units can be reasonably implemented within the time constraints of a school year, and the activities and routines within each lesson can reasonably be completed within the length of time suggested.
- The materials provide guidance for adjusting to local time and scheduling constraints. For example, materials provide teacher guidance on how to make adjustments to condense units within the Express Pathway found in the Unit Structure and Pacing guide if instruction needs to be shortened.
- The Grades 6–8 Program Guide includes a brief explanation of how to use the lessons successfully throughout the year; it also indicates that the structure of these lessons can be altered to fit different school districts' needs.

Discovery Education Science Techbook for Texas
Grade 8

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.

- Digital materials include an appropriate amount of white space and overall design that does not distract from student learning. Science Techbook supports student annotating and note-taking by allowing them to highlight text. The highlighted text automatically feeds into their digital Notebook, which can be accessed at any point in the learning cycle. Additionally, students can compile thoughts and notes relevant to each lesson within the structure of the notebook. Technology-enhanced items within the lesson page allow students to make their thinking visible. From the top navigation bar, students can access a series of tools that may be helpful with their interaction with lesson content, including graphing and whiteboard tools. Concept-level glossary terms are also hyperlinked within the text to provide additional comprehension support. Students can also access the full interactive Glossary on each lesson page and by selecting hyperlinked text within the lesson page.
- Digital materials include an appropriate amount of white space that does not distract from student learning. For example, materials include appropriate use of white space, such as margins, edges, and empty spaces around the content, all used consistently throughout digital materials. Materials use similar spacing between sections, equal line height in body text, and adequate spacing between paragraphs (greater than the line height of body text).
- Teacher guidance materials are designed with clear, designated places for important information. Teacher's Guides are designed in a way that teachers can locate important information for planning and implementation. Materials include resources such as an Assessment Guide, Program Navigation and Vertical Alignment Guide, and Program Guide. Each

unit includes resources such as Unit Structure and Pacing, a Unit Planner, Background Knowledge, Hands-On Lessons: Preparation and Materials, and Standards Alignment.

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

- Materials provide age-appropriate pictures and graphics that support learning and engagement without being visually distracting. For example, the student glossary contains multiple pictures and graphics, accessible when the student wants to use them and hidden when not needed.
- Materials consistently use age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. For example, student pages use two to three pictures per page on average (sometimes video clips are used). The Techbook utilizes clear images that are highly relevant to context.
- Materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. For example, in the grade 8 Force, Motion, and Waves unit, the lesson *Newton's Second Law* includes an image of two objects in space crashing into each other. Before the image, the Techbook prompts, “When you look at the moon’s surface, it is hard to miss all the craters covering its surface. One of the largest craters in the solar system is on the moon and measures 2,500 kilometers (1,600 mi) wide and 8 kilometers (5 miles) deep. Craters are evidence that asteroids and comets can apply immense forces on moons and planets when crashing into them. NASA constantly monitors space for objects that pose a risk of collision with Earth and its satellites. What do different crater sizes tell us about the mass of the objects that caused them? How do mass and acceleration affect the force of an asteroid’s impact? What are the causes and effects of the second of motion?” Following the image, materials prompt students to look at the image and discuss the provided questions.

Materials include digital components that are free of technical errors.

- Materials include digital components that are free of technical errors.
    - Materials are free of spelling, grammar, and punctuation errors.
    - Materials are free of inaccurate content materials or information.
    - Materials are free of wrong answer sheets to problems.

Discovery Education Science Techbook for Texas
Grade 8

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 science and engineering practices, recurring themes and concepts, and grade-level 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 science and engineering practices, recurring themes and concepts, and grade-level 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.

- Materials integrate digital technology and tools that support student learning and engagement. For example, student digital components include embedded tools, such as note-taking, variable font size, text-to-speech, a glossary, highlighting, and editable forms.
- Digital technology and tools enhance student learning through such features as videos, interactives, simulations, and online worksheets and assessments. For example, the grade 8 lesson *All Mixed Up*, within the Matter and Reactions unit, includes a video and an interactive simulation. It also provides two online data tables for students to complete to show their understanding.
- Materials provide students opportunities to double-click and highlight words within the text. When students engage in this action, materials prompt students with the choice to have the words read aloud and the capability to highlight them. This supports student learning and engagement.

Discovery Education Science Techbook for Texas Grade 8

Materials integrate digital technology to support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content.

- Materials integrate digital technology to support student engagement with science and engineering practices (SEPS), recurring themes and concepts (RTCs), and grade-level content. For example, materials provide interactive simulations and models for students to explore scientific concepts in a virtual environment.
- Materials consistently integrate digital technology to support student engagement with SEPs. For example, in the grade 8 lesson *All Mixed Up*, within the Matter and Reactions unit, an interactive lab guides students to explore the SEPs and model the differences between elements, compounds, and different types of mixtures.
- Materials consistently integrate digital technology in ways that support student engagement with the RTCs. In the grade 8 interactive *Make It Rain*, within the Weather, Climate, and Space unit, students identify and investigate cause-and-effect relationships by launching a digital activity to manipulate different air masses to create fronts. Students make observations about the weather associated with the fronts.

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

- Yes, materials do integrate digital technology that provides opportunities for teachers and/or students to collaborate. In Science Techbook, every concept features rich opportunities for peer-to-peer collaboration. Students have multiple opportunities to share models, explanations, and data with one another, allowing them to review their classmates' ideas and to obtain feedback on their own models, explanations, or data.
- Studio is a digital tool built into the program that allows student collaboration in an online setting. "Studio is a collaborative workspace where students can insert images and media content from the Discovery Education program to create presentations or demonstrate their applications of scientific and engineering practices. Student question boards, started in Engage, can be created in Studio and maintained over the course of the concept, as students refine their thinking. Teachers can also use Studio to develop and share content, support differentiation by varying lessons for individual or groups of students, and allow students to collaborate on whole-class assignments."
- Teachers have access to the Studio Help Center, where they can learn more about the collaboration tool and discover ways to integrate Studio into their teaching. Teachers need to enable chat for students to access it.

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

- Digital materials are accessible and compatible with multiple operating systems. For example, Single Sign-On Options include:
    - Google Single Sign-On
    - Office 365 Single Sign-On
    - ClassLink Single Sign-On
    - LDAP Single Sign-On
    - SAML/ADFS Single Sign-On
    - NCEdCloud Single Sign-On (NC Only)

Discovery Education Science Techbook for Texas Grade 8

- Digital materials are accessible and compatible with multiple operating systems. For example, Learning Management System integrations include:
    - Canvas & Discovery Education
    - Schoology & Discovery Education
    - Google Classroom & Discovery Education
    - Microsoft Teams & Discovery Education
    - Brightspace by D2L, and Discovery Education
- Digital materials are accessible and compatible with multiple operating systems. For example, Data Syncing Management options include:
    - Google Technical Requirements
    - Clever Secure Sync (SSO and Rostering)
    - PowerSchool AutoSend for Discovery Education
- Digital materials are accessible and compatible with multiple devices, broken down by computers or tablet/mobile devices. For example, the Discovery Education System Recommendations page shows for Computers: “Discovery Education works on desktop and laptop computers with a wide range of browsers. We recommend you use the most recent version of the following browsers to ensure the best experience: Google Chrome, Mozilla Firefox, Safari, and Microsoft Edge. Downloading the most recent version of a browser means you'll always have access to our latest and greatest features. While some features may be inaccessible, we won't stop you from accessing our site with an out-of-date browser.” For tablet and mobile devices, the page states: “While we don't support specific devices by name - we do ensure that our products work with devices using the most recent version of the following Operating Systems: ChromeOS, Android, iOS. What does this mean for you? If you use a device, for instance, an iPad, that has ones of these operating systems then Discovery Education should work on your device.”

Discovery Education Science Techbook for Texas Grade 8

Indicator 9.3

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

1	Digital technology and online components are developmentally appropriate for the grade level 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 grade-level appropriate and provide support for learning.

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

- The digital technology and online components are developmentally appropriate for the grade level.
- The digital technology and online components are aligned with the grade-level scope and approach to science knowledge and skills progression. For example, materials provide related TEKS and English Language Proficiency Standards (ELPS) for online and digital components within the Standards Alignment resources for each unit.
- The digital technology and online components are aligned with the grade-level scope and approach to science knowledge and skills progression. For example, the scientific content studied in the Classifying Matter Concept aligns with the student expectation as labeled (8.6A). The learning material proves reasonable to study in the given time frame of forty-five minutes in each lesson of the Classifying Matter Concept.

Materials provide teacher guidance for using embedded technology to support and enhance student learning.

- Materials provide teacher guidance for using embedded technology to support and enhance student learning. For example, the Educator Support section provides professional learning videos and articles on topics from how to navigate the Science Techbook, to a step-by-step

guide for ways to utilize materials in various Learning Management Systems, to videos and supports on instructional strategies.

- Materials provide teacher lesson plans that help guide teachers through a lesson with embedded technology. For example, in the grade 8 interactive lesson *On Your Wavelength*, within the Force, Motion, and Waves unit, students launch a virtual lab. The Lesson Planning document includes instructions for the teacher to guide students in using the embedded technology. “Launch the interactive, and complete the following: 1. Predict which color you think has the longest wavelength. 2. Check your prediction by placing the color into its position. 3. If the match is correct, record the name, wavelength, frequency, and fact about the color in your data table. 4. Repeat the steps for each color in order from longest to shortest wavelength. 5. Watch the animation at the end to learn more about the full electromagnetic spectrum.” Materials provide answers to the work students complete in the virtual lab.

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

- Materials include resources for parents and caregivers on supporting student engagement with digital technology and online components. For example, the Caregiver Course Overview, located in the Techbook’s Course Materials, provides unit-specific information, including ways to integrate learning into the home environment, such as a unit summary, key vocabulary, unit phenomenon, and home connections.
- Materials provide a letter with tips for families on supporting appropriate student engagement with digital and online components. The Parent/Guardian letter, located in the Techbook’s Course Materials, includes information on how to access program features at home. "Within this Student Edition, you’ll find QR codes that take you and your student to a corresponding online lesson of Science Techbook for Texas. Once in Techbook, students will have access to the Core Interactive Text of each concept, as well as thousands of resources and activities that build deep conceptual scientific understanding. Additionally, tools and features such as the Interactive Glossary and text-to-speech functionality allow Science Techbook for Texas to target learning for students of a variety of abilities."