TPS STEAM into Science Grade 4

TPS STEAM into Science Grade 4 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 3	100%	100%	100%	100%
Grade 4	100%	100%	100%	100%
Grade 5	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 somewhat 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 somewhat designed to build knowledge systematically, coherently, and accurately.
- The materials provide educative components to support teachers' content and coherence knowledge.

Section 4. Productive Struggle

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

Section 5. Evidence-Based Reasoning and Communicating

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

Section 6. Progress Monitoring

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

- The assessments are somewhat clear and easy to understand.

Section 7. Supports for All Learners

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

Section 8. Implementation Supports

- The materials include year-long plans with some 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 not intentionally designed to engage and support student learning with the integration of digital technology.
- The digital technology or online components are not 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 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, plan and conduct classroom, laboratory, and field investigations, engage in problem-solving to make connections across disciplines, and develop an understanding of science concepts.	M

Meets | Score 4/4

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 opportunities for students to develop, practice, and demonstrate mastery of grade-level appropriate scientific and engineering practices as outlined in the TEKS. Materials provide opportunities to make connections between and within overarching concepts using 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 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.

- Grade 3 materials in the *Learn By Doing STEAM Activity Reader Book Teacher Edition* include opportunities for students to practice, develop, and demonstrate mastery of grade 3 scientific and engineering practices (SEPs) as outlined in the TEKS. For example, a lesson on ecosystems provides opportunities for students to build terrariums and investigate the effect of too much or too little water on plant life. This experience supports students in planning and conducting investigations using the Scientific Method to answer a question and analyzing and interpreting data to derive meaning. They also provide opportunities for students to practice, develop, and demonstrate mastery of the SEPs as outlined in the TEKS. Opportunities include, for example, Science Is a Verb (SIAV) and a lesson found in the *Teacher Textbook* to provide teacher guidance

as students evaluate how some plants adapt to change better than others using inquiry. Also, students use scientific practices to conduct a descriptive investigation, collect observations and measurements, and analyze data to derive meaning.

- Through the narrative in *Learn by Doing STEAM Activity Book* Chapter 6, a character introduces a building challenge, materials, and general criteria. The narrative also mentions the students pre-testing, redesigning, and engaging in a final testing phase. The Grade 3 materials include opportunities for students to develop a model of the Sun, Moon, and Earth to demonstrate the bodies' movement. The students create a physical representation of each body, ensuring the Earth and Moon are able to rotate and revolve. The introduction section includes a section titled Scientific Method, where the materials provide a diagram linearly depicting steps in the process. The subsequent text provides guidance for teachers to further explain each step in the diagram. Portions of this explanation address Scientific and Engineering Practices (SEPs), in which students are expected to ask questions and conduct investigations.

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

- Materials identify overarching concepts using recurring themes and show how they connect within the materials. Materials also include opportunities for students to make connections within overarching concepts using the recurring themes. For example, a lesson on ecosystems in the *Learn By Doing STEAM Activity Reader Book Teacher Edition* provides teacher guidance to support student understanding of systems and the interdependence in the function of the system as demonstrated in the TEKS. For example, students investigate cause and effect relationships and how they are identified and explain the change during a grade 3 lesson on ecosystems.
- The lesson on energy in the *Teacher Textbook* demonstrates students investigating the overarching concept of energy. For example, in grade 3, students know energy is everywhere and can be observed in cycles, patterns, and systems. Students explore different forms of energy, including mechanical, light, sound, and thermal in everyday life. The lesson on environmental changes in the *Teacher Textbook* demonstrates students investigating patterns, cycles, systems, and relationships within environments. For example, in grade 3, students also describe how changes in the environment cause some organisms to thrive, perish, or move. The lesson on "Earth's Changing Surface" from the *Teacher Textbook* demonstrates students investigating the overarching concept of modeling Earth processes. For example, in grade 3, students create models of volcanoes that change the Earth's surface.

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 support teachers in developing student content, concepts, and skills by giving them resources and cues at varying points in the lessons and units. For example, a lesson on ecosystems in the *Learn By Doing STEAM Activity Reader Book Teacher Edition* contains Idea Boxes that explain, describe, and make connections to develop conceptual understanding. The materials strategically develop students' content knowledge and skills for third graders. The scientific and engineering practices (SEPs) are integrated into investigations so students can build and connect knowledge and apply it to new concepts. For example, in a lesson on the survival of plants and animals in an ecosystem, materials provide teacher guidance about

common preconceptions students have about animals. Student text provides multiple examples of animals that migrate or hibernate.

- The materials focus on recurring themes, specifically unpacking systems in the Introduction, creating and evaluating models, and identifying patterns and data using input-output tables. The materials arrange concepts to explore systems such as the bodies in the Solar System. The content begins with a big-picture view of the system and then zooms into addressing specific components. The progression from chapter to chapter is also arranged to connect content with previous content. For example, the study of the water cycle follows the introduction to the solar system. The *Teacher Textbook* includes a Project-Based Lesson describing the integration of SEPs into a project-based learning format. The materials offer a general description, such as "Research on a problem should be carried out before beginning to design a solution." but do not apply content.
- Materials in the *Teacher Textbook* lesson plan on Energy provide teachers with guidance to enhance student learning using scaffolding information, background text, common misconceptions, teacher tips, and support suggestions for special populations. The *Teacher Textbook* also demonstrates how the content is designed to develop and build student content knowledge with the presence of a Scope and Sequence explaining how the program is structured, showing how students are able to make connections across units.

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

- The *Learn By Doing STEAM Activity Reader Book Teacher Edition* includes opportunities for students to engage in problem-solving to make connections across disciplines and develop an understanding of science concepts. For example, grade 3 students make connections between science and math when they use multiplication and division skills to find an unknown, analyze data about ecosystems presented in a bar graph, and create a bar graph using a provided data set. Students determine how many crickets are needed to feed a given number of frogs or determine how many frogs a given number of crickets can feed. The students then analyze a bar graph representing the population data in a particular ecosystem and finally create a bar graph using different population data. Materials also include opportunities for students to engage in problem-solving to make connections across disciplines and develop science concepts. For example, grade 3 students make connections between science and literacy after they have studied the adaptations of different animals and plants and are challenged to explain the adaptations of a newly discovered plant and animal from a specific type of ecosystem.
- The materials allow students to practice Scientific and Engineering Practices (SEPs) by designing solutions and investigating the efficiency of the design. The activity in the *Teacher Textbook* asks students to examine designs to quickly remove oil from animal feathers. The students test each prototype, and record observations to determine which model removes the most oil. The materials provide opportunities for problem-solving in every unit across the grade level. The materials present students with a challenging engineering design process through the text. The materials also provide criteria with which to evaluate their prototype as well. For example, in Chapter 6, the materials provide multiple opportunities for students to apply their understanding of defining a problem, generate solutions based on criteria and within constraints, and conduct a fair test to evaluate their prototype.
- The *Teacher Textbook* provides sufficient opportunities for students to ask questions and plan an investigation. For example, the lesson on forces and motion provides a set of guiding

questions the teacher can ask to help students investigate Newton's first two laws of motion with simple machines. After the investigation, students prove Newton's laws with a demonstration and explanation to the class. The STEAM Activity Guide provides opportunities for students to conduct investigations and engage in problem-solving to make connections across disciplines. For example, in the activity "Crank it Up," students construct cranes and scales to measure the force it takes to lift an object, following a set of guided instructions. Students then answer questions to make real-world connections between science and math concepts.

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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.	PM
2	Materials intentionally leverage students' prior knowledge and experiences related to phenomena and engineering problems.	PM
3	Materials clearly outline for the teacher the scientific concepts and goals behind each phenomenon and engineering problem.	PM

Partial Meets | Score 2/4

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

Materials partially 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 some students' prior knowledge and experiences related to phenomena and engineering problems. Materials clearly outlined for the teacher some of the scientific concepts and goals behind each phenomenon and engineering problem.

Evidence includes but is not limited to:

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

- Materials utilize phenomena intermittently throughout the program. Materials do not carry out the investigation of phenomena and problems across lessons.
- For example, the *Learning by Doing STEAM Activity Reader Book* does not explicitly state the anchoring phenomenon but instead launches directly into the change to the land. An example in grade 3 Chapter 7 includes images, facts, captions, and texts. The chapter continues to address conservation, fossilization, and properties of soil. The characters, a presenting teacher, and a class of students are the only common components carried throughout the chapter or any of the activities. The materials provide a phenomenon statement at the beginning of the Project Based Lesson. The grade 3 example from Earth and Space in the *Teacher Textbook* is "Obtain and combine information to describe that energy and fuels are derived from natural resources. . ." The content is continued throughout the chapter but does not act as an anchor. Chapter 6 includes "Design Engineering Challenge – Earthquake" with a diagram to support teachers and students. Students previously followed characters through the design process and had the

opportunity to apply their learning. In the following activities, students develop a landform, evaluate the damage due to the earthquake, and communicate their findings. Students model landslides and earthquakes based on their reading of the Chapter 6 materials. In Chapter 6, Activity 5 students research a volcanic event, this is related to the concepts covered in Chapter 6. In Chapter 6, Activity 2, the students define a problem and build a solution using the design engineering process. The materials provide an opportunity for students to develop, evaluate, and revise their thinking as they engage in phenomena when studying how organisms respond to environmental changes. During the discussion portion of the lesson, students look for patterns in the data shared from the research to determine the types of organisms, but that survive, perish, or move on. Materials embed a culminating activity for students to consider the life cycles of different organisms as they present their research about a specific animal through art. In the *Learn by Doing STEAM Activity Reader Book*, Chapter 6, students model landslides and earthquakes based on their reading of the Chapter 6 materials. In Chapter 6, Activity 5, students research a volcanic event. This is related to the concepts covered in Chapter 6. In Chapter 6, Activity 2, page 91, the students define a problem and build a solution using the design engineering process.

- Students engage in phenomena when studying how two materials can be combined to form a stronger mixture. During the investigation and discussion portion of the lessons, students make predictions about what material would make a stronger bridge. Students then discuss how engineers use mixtures to create stronger bridges.

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

- The engineering design process and details for phenomena being studied in this grade is first taught and applied in Learn By Doing. The Teacher Textbook content provides Science is a Verb (SIAV) investigations, expository text, and matching activities, followed by STEM and Arts projects in the STEAM Activity Guide. Assessments then appear in the assessment guide and assessment generator. Prior knowledge and experience is present for phenomena and engineering.
- Students make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. Students first research where windmills are used, then students build a model of a windmill describing the flow of energy, finally, students describe the flow of energy in their homes. Students use their prior knowledge of tools and materials to build a device (the windmill), identifying the different types of energy, and identifying materials that are conductors and insulators.
- Materials provide teacher guidance about potential student misconceptions, but the guidance is directed towards the science concepts in general, rather than misconceptions related to the phenomenon. For example, materials provide teachers guidance at the beginning of each unit, titled "Common Misconceptions" to help gauge where some students may have inaccurate prior knowledge. The sections also inform teachers of the necessary prerequisite content and skills students need to be successful. For example, in the lesson on Mixtures, the common misconceptions list detailed explanations of the meaning of a mixture. Materials do not provide teacher guidance about common misconceptions related to bridge construction, the engineering problem for the unit.

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

- Materials outline for the teacher the scientific concepts and goals behind some phenomena and engineering problems in some resources. For example, in the lesson, “The Impact of Natural Earth Processes on Humans,” the materials provide vertical information, scene background, and common preconceptions related to the goal. The materials contain guiding materials addressing each student’s goal, the related phenomena, and additional examples. The materials also provide guiding questions to support instruction. The materials offer several Anchoring Phenomena in the Instructional Segment: States of Water, a Vignette within the STEAM Activity Guide. The example addressing Organisms and Environments states, “Natural Systems proceed through cycles that humans depend upon, benefit from, and can alter.” The following materials direct students through activities addressing the phenomena through demonstrations, investigations, developing models, and research. However, the related text in *the Learn by Doing STEAM Activity Reader Book* does not follow a similar format, identify a phenomenon for study, or clearly outline the goals before launching into reading material describing a wide range of science concepts. The storytelling component includes phenomena, but there is no identification of the phenomena or teacher support for the phenomena presented in the storytelling component.
- The materials outline the scientific concepts behind the phenomenon that identifies the vertical alignment across grade levels. Specifically, the phenomenon is reflected when students ask questions and predict outcomes about the energy changes that occur when objects collide. For example, in a grade 3 lesson on energy, materials leverage the phenomenon in the previous grade focusing on how to plan and conduct investigations to design an investigation on the effects of mechanical energy. Materials provide a “Background Information” section that outlines overarching learning goals for each phenomenon and engineering problem addressed. The explanation unpacks the meaning of the scientific idea, so teachers can understand how to help students reconstruct the idea. For example, in the Science is a Verb (SIAV) lesson on circuits, the background section explains why the power source of a circuit is a battery instead of the circuit being plugged directly into an outlet.

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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.	PM
2	Materials are intentionally sequenced to scaffold learning in a way that allows for increasingly deeper conceptual understanding.	PM
3	Materials clearly and accurately present grade-level-specific core concepts, recurring themes and concepts, and science and engineering practices.	PM
4	Mastery requirements of the materials are within the boundaries of the main concepts of the grade level.	PM

Partial Meets | Score 3/6

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

Materials are somewhat 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 some learning in a way that allows for increasingly deeper conceptual understanding. Materials clearly and accurately present some grade-level-specific core concepts, recurring themes and concepts, and science and engineering practices. Some of the mastery requirements of 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 introduce some content through the text in the *Learning By Doing* Student Reader. Materials do not explain how grade 4 learning goals connect to previous learning goals in grades K-2. Student Reader Texts provide some background connections through the use of idea box prompts and dialogue. The narrative prompts students to think of examples demonstrating content, prior learning, or potentially other units. The text uses a story-based approach where character dialogue introduces, teaches, and connects content. Idea boxes may also address the content. The first lesson component in the *Learning By Doing* text begins with a setting description and the teacher character asking students to describe what is occurring. The first lesson component describes a group of students working with a teacher to use energy to make a card. In Chapter 2, the text says, "The students explained to Mrs. Chen that they have been learning about different energy. They drew pictures and wrote descriptions of the different energy forms." The text then includes a definition. Concrete, hands-on activities follow the story to reinforce the content addressed in the story.
- The grade 4 teacher materials list concepts students should understand from previous grades, but these materials are not student-facing. The narrative prompts students to think of examples demonstrating content, prior learning, or potentially other units. The resources do not explicitly support students building upon content across units or grade levels.

- Materials list "future learning" within the vertical progression for some lessons. Materials do not list or describe what future learning skills and knowledge the lesson includes. The Vertical Alignment Tables do provide TEKS across grade levels and citations of where these standards can be found within the *Learn By Doing STEAM* Activity Reader for each grade, however, educators would need to reference past and future grade-level learning materials to determine what and how content was presented. The Horizontal Alignment Chart outlines how chapters include different components of TEKS including SEPs and standards from the previous grade, however, it does not provide additional content for horizontal alignment that is already included in the Essential Content Guide found in the *Learn By Doing STEAM* Activity Reader.
- The Essential content guide provides an overview of how each chapter builds in complexity on content for science, math, and ELAR. For example, in Chapter 1 "Hit the Ball," science content builds from Activity 1 exploring the effects of force on an object to Activity 2 investigating speed and velocity. In Chapter 2 "Light Bulbs and Circuits," in the *Learn by Doing STEAM* Activity Reader Book, activities build from differentiating the different forms of energy to identifying conductors and insulators of electrical and thermal energy, to finally electricity and circuits.
- In the grade 4 Teacher Textbook, the traditional lessons provided include some scaffolding information at the beginning that outlines how the standard builds upon work students have covered on a topic in previous grades and how future study builds upon the grade-level TEKS being covered in the lesson. For example, a lesson on solids, liquids, and gases details how students compare and classify the properties of objects in grades K-2 by listing the specific grade-level TEKS and showing the progression of learning in grades 4-5, again by listing the specific grade-level TEKS.
- Materials provide scaffolding information in traditional lessons in the Teacher Textbook.

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

- The Program Guide describes the lesson progression with each resource. The guide explicitly states teachers begin each unit with the *Learning By Doing* Reader and then move to the exploration in the Teacher Textbook. The *Learning By Doing* Reader introduces all chapters with fictional characters asking and answering questions. Materials intentionally provide content information before students move to exploration. The lesson plans in the Teacher Textbook begin with students engaging with media or discussing the current knowledge. For example, in a PBL lesson on weather, the lesson starts with describing the weather, asking students to describe the current conditions and define weather.
- Materials include a progression of concrete and then representational before abstract reasoning when presenting the concept of magnetism. For example, materials use an approach when describing the physical properties of matter by starting with a phenomenon. In the Teacher Textbook lesson "Properties," students conduct an investigation on magnetism. Students predict and test what objects will be magnetic or not. Students measure the strength of the magnetic object's attraction using a ruler before recording their observations and creating a scale of the strongest attraction to the weakest attraction. Students and the teacher discuss possible causes of strong and weak attractions on different magnetic objects.
- Materials sometimes include a progression of concrete and then representational before abstract reasoning when presenting the concept of mixtures and solutions. For example, the STEAM Activity Guide lesson "Amelia Rose Explores Matter and Energy" uses an approach when describing physical properties of matter by starting with a reading of a story rather than a phenomenon. The lesson progression includes the addition of oral stories and a craft that does

not add to a deeper conceptual understanding. The lesson has students work through concrete investigation and draw representational models. Students do not include abstract reasoning. Materials in the *Learn by Doing STEAM* Activity Guide do show progression through text from representational to concrete through stories (representational), hands-on investigations (concrete), and abstract is represented through some research activities.

- A lesson on inherited traits in grade 4 begins with a short story to activate students' prior knowledge. Within the text, students are presented with reminders of what was learned in previous lessons and grade levels from the point of view of the students in the story. For example, "the class had also learned about the life cycles of several animals." The lesson further activates student background knowledge with "Idea Boxes," for example, asking students to complete a survey of traits they may have inherited or learned. Materials provide background text before each lesson, allowing students to build on what they already know to increase their understanding of the new content. For example, the lesson “Mixtures and Solutions” builds on the student's knowledge of mixtures before introducing physical and chemical changes.

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

- Materials do not provide clear instruction for some grade-specific core concepts, recurring themes and concepts (RTCs), and science and engineering practices (SEPs). For example, in the project-based lesson on waves and wavelengths found in the Teacher Textbook, materials inaccurately label phenomena as “develop a model to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.” Materials do not clearly distinguish phenomena from RTCs and SEPs. Within the lesson, materials provide a color-coded description of developing and using models, wave properties, and patterns.
- Materials include a pacing calendar that identifies the theme for each unit such as "Unit 1 - Scientific and Engineering Practices" and "Unit 2 - Matter and Energy" that includes the knowledge statement for each strand of the TEKS included in the unit. However, this document does not demonstrate how materials clearly and accurately provide instruction for educators unfamiliar with the language of the TEKS.
- Lessons provide instructions for carrying out an introduction, textbook work, and an investigation. Lessons do not clearly identify concepts, RTCs, or SEPs within each. For example, in the lesson on patterns found in the Teacher Textbook, materials state the objective as “Students will collect and analyze data to identify sequences and predict patterns of change in shadows, tides, seasons, and observable appearance of the Moon over time.” The material does not clearly distinguish core concepts from RTCs or SEPs.
- Materials go beyond some grade-level core concepts and SEPs. For example, grade 4 student materials present accurate information about mixtures in the expository text. Some of the activities involve students looking at the physical properties of the ingredients in a mix, specifically density, which goes beyond the scope of investigating and comparing a variety of mixtures. Students demonstrate and explain what happens to the physical properties of mixtures in grade 5 TEKS. Activity 1 on page 57 of the *Learn By Doing* (LBD) guides teachers to explain how density is determined, relating mass and volume during the "Analysis and Discussion" portion of the activity. This extends beyond the grade 4 core concept of classifying matter by relative density, which addresses sinking or floating in water.
- For example, a grade 4 lesson on patterns in the observable appearance of the Moon from Earth includes expository text about the shadows, specific phases of the Moon, and tides. Student activities after the text include comprehension questions that address concepts not included in

the TEKS and an investigation for students to track their shadows throughout a school day. Grade 5 TEKS include the study of the patterns of change in shadows and the specific Moon phases and tides are included in the middle school TEKS.

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

- Materials provide a Scope and Sequence and a Pacing Calendar that outlines when learning targets are introduced, developed, and mastered within the program. Materials in the *Learn by Doing STEAM* Activity Book list student objectives before each activity. For example, in Activity 1 “Velocity or Speed,” students’ objective is "to be able to distinguish between velocity and speed."
- Specific lessons may include a description in the "Scaffolding Information" section with a content progression. For example, a lesson on Science and Engineering Practices states, "this standard builds upon experiences and background that students may have had at home, and were taught in Grades K-2." Materials continue to note goals for the current lesson and future study. Materials include an objective in the hands-on portion that state the lesson goals. The same lesson also includes an assessment opportunity. Materials do not describe boundaries or content limitations. A weather lesson displays an objective and a prompt to "ask students to predict the weather to come using the weather chart you are showing them."
- Materials do not clearly define the boundaries of content that students must master for the grade level. For example, in grade 4 expository text “Hit that Ball!” materials provide a text introducing *inertia*, *speed*, and *velocity*. Grade 4 TEKS include student understanding of how forces such as gravity, friction, and magnetism affect an object in motion. Grade 4 TEKS do not include concepts about *inertia*, *speed*, and *velocity*.
- For example, in a grade 4 lesson on traits, the Teacher Textbook provides background on inherited traits, multiple types of learned behaviors, and acquired traits but does not provide boundaries that learned behaviors are focused on in grade 5. The student activities that follow continue to reference learned behaviors rather than acquired traits, which are stated in the grade 4 TEKS. Also, the text describes the chemical reaction in photosynthesis in the grade 4 *Learning By Doing* Teacher and Student Editions. The TEKS do not include relative density until grade 4 and do not include buoyancy. The *Learning By Doing* text describing the water cycle begins with water as a "super-molecule," addressing the substance's molecular composition. The TEKS introduces molecules in grade 6. Grade 4 students classify matter as a solid, liquid, or gas.

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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.	PM
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.	M
3	Materials explain the intent and purpose of the instructional design of the program.	M

Partial Meets | Score 3/6

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

Materials provide some support to teachers in understanding horizontal and vertical alignment guiding the development of grade-level content, recurring themes and concepts, and scientific and engineering practices. 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 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.

- The introductory materials in the Teacher Textbook state, "Science Concepts, scientific practices, and engineering are introduced in this first component," in reference to the *Learn by Doing* Activity Reader. However, neither the Teacher Textbook nor the *Learn by Doing* Activity Reader indicates how or when scientific practices or overarching concepts are addressed in each section or within each topic. The inclusion of the Horizontal Alignment Chart, the TEKS 1-5 Content Guides, and the update of the pacing guide provide a document that shows when scientific and engineering practices and recurring themes are addressed. This provides minimal support to the teacher in understanding how this or how content builds horizontally or vertically.
- The Program Guide describes the vertical and horizontal alignment of the program. It references the use of a storybook "to provide an introduction to in a personally relevant manner." The STEAM Storybook is followed by the activities section. Materials say "These activities build upon communication, creativity, critical thinking, and collaboration." Materials state, "As students progress through the grade levels, the STEAM storybooks provide opportunities to develop knowledge and skills gradually built through vertical alignment through the TEKS. The description in the Program Guide does not fully support teachers, as it does not reference

specific learning. In the *Learn By Doing STEAM* Activity Reader Book, Teacher Edition, there are several documents that, when used together, provide specific learning.

- Materials include some guidance that supports teachers in understanding how new learning connects to previous and future learning across grade levels in the Scaffolding Information within the lesson. In the beginning of the Traditional lessons, the Scaffolding Information section provides some information on knowledge students should already have, then lists the TEKS for the previous and future grade levels. Listing the TEKS does not provide enough guidance about connection to future learning. Materials provide minimal guiding documents or information that support teachers in understanding how new learning connects to previous and future learning across grade levels.
- The instructional materials include some guiding documents that support teachers in understanding how new learning connects to previous and future learning across grade levels. For example, The *Learn By Doing STEAM* Activity Reading includes an "Essential Content Guide" that describes what science, math, and ELAR concepts are taught in each unit. There is a horizontal and vertical alignment information document in the Online Library for Teacher Support. This provides general information and does little to help teachers understand how their specific grade-level content connects to prior or future learning.

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 provided background information for teachers that provide explanations and examples of science concepts. For example, the *Learn By Doing STEAM* Activity Reader provides teachers with information about inertia during a lesson on force and motion. Materials provide information related to the concept and a mind map activity for teachers to complete with students. Materials provided background information for teachers with explanations and examples of science concepts. For example, the Teacher Textbook provides teachers with information about evaporation and condensation. The lesson plan provides a "Background and Misconception" section that informs teachers about condensation and evaporation in nature, as well as how it can be replicated with a cup. The section includes diagrams and key points for the teacher to point out. In the *Learn By Doing STEAM* Activity Reader Book Teacher Edition, there is a reference guide in the appendices that allows for further reading for teachers to deepen their knowledge and provide background information.
- The "Background and Misconceptions" section provides teachers with information to support the development of their content knowledge. For example, the Teacher Textbook provides context for teachers to understand how "waves transfer energy from one place to another." The background materials consist of less than a paragraph and a list of teaching tips. Materials provide background on the physical properties of matter in the Teacher Textbook. Materials specifically address mass, temperature, melting point, volume, density, texture, length, and boiling point for the teacher. The Background and Preconceptions sections offer teacher background to support the teacher's understanding of the content. The section mentions the use of balances and scales in the last paragraph but does address the related Science and Engineering Practices. Materials provide reference overarching themes in the background information. The Background and Misconceptions section provides extensive background information, much of it beyond the scope of the current grade level, and if for the teachers' information and background knowledge only as they develop their content knowledge.

- Materials include Teacher Tips to support teachers in developing their understanding of the content and how to further implement the current lesson. For example, in the lesson *Properties*, the Teacher Tip states "Hold up a number of different objects. Ask students to describe their properties, and then to compare and contrast them." The publisher lists the Idea Boxes in the *Learn By Doing STEAM* Activity Guide as additional support for this indicator, however as stated in the resource, idea boxes are intended to "stimulate collaborative discussion and reinforce the concepts introduced. Materials do not provide additional resources to support the teacher's deeper content knowledge, such as online resources, current research articles, or podcasts.

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

- In the Program Guide, the “Philosophy of Science” teacher and learning section states, “TPS believes that we learn best by doing. Science is more than memorizing facts. It is a way of organizing and understating the surrounding universe.” The section references active learning, STEAM, storytelling, and inquiry as main strategies. Materials provide information about the publisher that describes the program's instructional approaches. For example, the publisher refers to their materials as a “Toolbox.” The Toolbox is made up of “three key inquiry-based component areas.” The first area includes traditional textbook lesson plans, collaborative and individual investigation, expository text, and activities aligned to TEKS and assessments. The second area includes “inquiry-based activities via lesson cycles covering a group of standards.” The third area includes art projects that “are inclusive but particularly useful for far below grade level students, ELL, and special education users.”
- The *Learn By Doing* Reader Teacher Guide describes the TPS program goals and its focus on literacy. The introduction states the materials “are designed to teach science concepts through stories relevant to the world of third-grade students while at the same time providing integrated opportunities to teach technology, engineering, arts, and math with science." The Teacher Textbook includes a double-page spread, Summary Steps, to describe the purpose behind each component. The guide notes the *Learn by Doing* Reader Activity Reader Books as the first step, the textbook as step 2, the STEAM Guide as step 3, and the assessment guide as step 4.
- Materials provide a framework explaining the main intent or goals of the program. For example, the *Learn By Doing STEAM* Activity Reader Guide Teacher Edition describes the intent of the STEAM reader as being “designed to introduce STEAM in an integrated fashion, instead of the traditionally separated method.” A broad overview of the instructional approach is included to offer guidance in the areas of reading, comprehension skills, creating and editing drafts, activities, and pacing, vocabulary, the scientific method, safety in the classroom, systems, and the design engineering process. Materials provide a purpose for the structure and organization of the materials in the program. The Teacher Program Guide provides an explanation for why materials are designed the way they are. For example, materials in the Teacher Textbook follow a lesson structure with step-by-step “Introduction, Middle, and Summary” as well as “Science Is A Verb” labs which “allow teachers and students to see the science happen and to ensure preconceptions are not passed on.”

TPS STEAM into Science Grade 4

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.	PM
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

Partial Meets | Score 2/4

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

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

- In the Teacher Textbook, materials guide the teacher in explaining, "Science is a process (scientific method), used to investigate the natural world within and around us to generate knowledge to solve problems and improve our world." Materials then describe student behaviors within each step of the scientific method, such as ensuring students consider and include planned steps for how they will collect data during their investigation. The Teacher Textbook consistently provides activities that support sensemaking through various activities. For example, the weather chapter includes The Science, a section that delivers content through expository text. The chapter also incorporates investigations to support sensemaking through thought-provoking hands-on experiences. How is Water Recycled? invites students to process through writing, first to communicate observations in a chart form and then reflect on the processes observed in the investigation.

- Materials provide learning activities that support students' meaningful sensemaking. For example, in the grade 4 lesson "What can fossils tell us about the past?" students use thinking and writing to make sense of identifying fossils.
- Materials provide guidance on activities and discussions similar to sensemaking. There are many examples of sensemaking in the *Learn By Doing STEAM* Activity Reader Book, which has all the components of sensemaking. This approach can be found on the NSTA website (Sensemaking | NSTA). For example, in Activity 3, the students develop a circuit to solve a problem using the Design Engineering Process. They first develop knowledge of the science concepts through the chapter text, idea boxes, and other activities (Phenomena), develop a design of their circuit that meets the scientific requirements for a circuit (Sense of Science), build their circuit using the design engineering process (Practices), and generate ideas through the communication and discussion of their design (Student Ideas).

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

- The materials provide some opportunities to engage with grade-level appropriate scientific texts. However, in the Learn By Doing STEAM Activity Read for grade 4, Chapter 1, students read about the movement of a ball. The text continues on to discuss velocity and how to calculate velocity and discusses acceleration. Later in the chapter, in "Activity 1 Velocity or Speed?" students are expected to distinguish between velocity or speed situations. These are not grade-level appropriate pieces of scientific text for grade 4. In the TEKS, the concepts of velocity, acceleration, and differentiating between speed and velocity were not introduced until middle school, specifically grade 7, TEKS 7.7B.
- The materials provide some opportunities to engage with grade-level appropriate scientific texts. However, in the Learn By Doing STEAM Activity Read for grade 4, in Chapter 2, Light Bulbs and Circuits, the text discusses forms of energy but introduces, explains, and actively uses the terms kinetic and potential energy, as well as chemical energy. For example, the text states, "All energy is either potential stored energy or kinetic energy, the energy of motion. Mechanical energy is the sum of potential and kinetic energy." While this is scientifically accurate, it is not grade-level appropriate scientific text for grade 4. Potential and kinetic energy is introduced in grade 6, with TEKS 6.8C.
- The materials provide some opportunities for students to engage with grade-level appropriate scientific texts. However, in the student textbook for grade 4, in the section on Matter and Energy, Project-Based Lesson, the materials spend several pages on chemical changes, with keywords such as "chemical change, chemical reaction, endothermic, and exothermic." Later, in the activity, "What Energy is Hiding? an energy checklist includes chemical energy as a form of energy, even though it is not listed as a form of energy studied in grade 4. These terms are not grade-level appropriate for a grade 4 scientific text as these concepts are not introduced until middle school in TEKS 6.6E.
- The materials provide some opportunities for students to engage with grade-level appropriate scientific texts. However, in the Science is a Verb activity Waves without Water, the investigation involves a discussion of the wavelength and amplitude of waves. This is not grade-level appropriate scientific text as this is a middle school science topic introduced in grade 8 with TEKS 8.8A.

TPS STEAM into Science Grade 4

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 allow students to communicate in written forms for multiple purposes within a chapter. In the “Ice, Water, and Water Vapor” text, students make predictions before and draw conclusions after their investigations. Students apply their learning through a set of common scenarios. Materials provide opportunities for students to unpack investigations through writing, connecting their observations to content learned in prior lesson components.
- For example, a PBL lesson addressing the movement of the Earth around the sun asks students to bridge their kinesthetic experiences with the movement of the solar bodies. Another question requires students to precisely apply the content of rotation to their and the Earth's motion.
- In a grade 4 “Think and Craft” activity from the STEAM Activity Guide, students create a pictogram showing the results of the weather project work and write a sentence to explain their choice of clothes and the weather in their chosen season.”
- In an activity on inherited traits, students research multiple breeds of a type of animal and write about at least three inherited traits the animal has before presenting their findings to the class.
- In Chapter 1 of the *Learn by Doing STEAM* Activity Reader, Activity 7, students provide a report on a fossil that provides information on the environment it lived in. Students create a poster of their fossil with their environment described and a short report addressing the research questions and other supplementary questions.
- In Chapter 6 of the *Learn by Doing STEAM* Activity Reader, Activity 2, students draw and label the water cycle using materials resembling some of the components, like cotton wool for clouds and blue, transparent plastic for water. Students write a description, including the important role of the Sun in the process.

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 allow students to struggle productively through scaffolding and guided investigation. In Chapter 8, students study the impact of soil on plant growth. Students predict the best soil for growing plants, combined with an explanation based on their understanding of the preceding text. Materials support the teacher to facilitate the investigation without dictating each aspect of materials and methods. The flexibility allows students to apply the knowledge gained and consider components that can impact the investigation.
- Materials create transfer opportunities for students to take what they have learned and use it flexibly in new situations. For example, in the *Learn by Doing STEAM* Activity Reader, after reading an expository text on circuits and a short-story text about a light-up birthday card, students use the design engineering process to create a decorative card with a message to be placed in the classroom with a circuit to illuminate it. The activity provides hints for multiple types of circuits, showing flexibility. Materials create transfer opportunities for students to take what they have learned and use it flexibly in new situations. For example, in the Student Textbook, students complete a problem-based lesson, using the design engineering process “to solve a real-life problem that affects us in the classroom or at school.” The lesson guides students through the complete Design Engineering Process to create their own product (solution).

TPS STEAM into Science Grade 4

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.	PM
2	Materials include embedded opportunities to develop and utilize scientific vocabulary in context.	PM
3	Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and grade level.	PM
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.	PM

Partial Meets| Score 2/4

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

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

Evidence includes but is not limited to:

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

- The materials provide some support in prompting students to use evidence, for example, in a chapter addressing earth science concepts, the Learn by Doing - Student edition provides an investigation-focused activity. The materials provide only the guidance, "Record your hypothesis, materials, methods, results, analysis, and conclusion. If you use drawings, please label them." The directions, such as reminders to collect quantitative and qualitative data and prompts to "record whether their hypothesis was correct and what they learned," are only available for teachers. The teacher edition of the Learn by Doing STEAM Activity Guide offers prompts for the teacher in Activity 7, Law of Conservation of Matter. For example, the materials state, "Remind (the students) that hypotheses are tentative and testable statements supported by limited evidence." The student edition does not extend prompts for the students to use evidence to support evidence. The same activity for students only states, "Write your initial observations and hypothesis, and then record in writing and labeled drawings your materials, methods, results, and conclusion."
- The materials prompt students to use evidence when supporting their hypotheses and claims. For example, the activity "Plant Growth in Different Soils" from Chapter 8 of the Learn By Doing

prompts teachers to have students "record whether their hypothesis was correct or not correct, why and what they learned from this experiment." The materials do not prompt students to use evidence when supporting their hypotheses and claims. For example, in the lesson "What Energy is Hiding" in the Teacher Textbook, students are prompted to provide evidence for the claim, "Some say that sound energy is mechanical energy." This guiding bullet focuses on students using evidence to support their claims rather than the one provided.

- In the Learn by Doing STEAM Activity Guide, students analyze shadows during the year. Materials ask students to describe their results (evidence) after a year of collecting data and explain where their predictions are correct and why, followed by a series of questions that can only be answered using evidence. In an investigation comparing magnetism. students are told to discuss their results and answer follow-up questions using support from their results to explain why.

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

- Materials present scientific vocabulary using two representations, embedded in the text with bold letters and in Key vocabulary charts. Materials do not include corresponding visuals for many vocabulary terms. In Chapter 2 of the Learn by Doing STEAM Activity guide, materials embed vocabulary within the text in bold letters with pictorials for most of the words. Materials present scientific vocabulary using keyword charts with the vocabulary word and its definition. In the lesson Properties in the student textbook, materials provide a keyword chart with vocabulary words and their definitions but no visuals
- Materials present scientific vocabulary using word wall charts with the vocabulary word along with its definition. In The Best Materials of the STEAM Activity guide, students are provided a word wall chart containing their vocabulary words with their definitions. Students are then asked to find the words within the chapter as a word wall activity. Materials present scientific vocabulary embedded within text in bold letters. In the student textbook, vocabulary is given to students within the informational text in bold letters, used in a sentence. Some of the words are represented through symbols on a weather map. Students are also provided with a keyword chart with the words listed with their definitions.
- The materials provide some opportunities for students to apply scientific vocabulary within context. For example, in the Teacher Textbook, the materials provide a lesson in Unit 2 on changes. The lesson includes a discussion on the scientific concepts, textbook work students complete on their own that includes a glossary of key terms at the end of the reading, and an investigation where students observe a demonstration of states of matter changes in water. The activity provides a prediction time where students write what they predict will happen. They watch the demonstration and then discuss as a class what they observed. The activity provides opportunities for students to use scientific vocabulary such as "vapor" and "condensation" in writing and speaking. The materials also provide additional support for Emergent Bilingual students, stating, "Ensure that students are familiar with all the vocabulary of state and changes of state. Have students use language they find accessible…If they have trouble writing, they could make observations verbally.

TPS STEAM into Science Grade 4

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

- The materials allow students to create a Light Up Card in the Learning by Doing Activity Guide. The student edition supports engagement in the engineering design process. However, the teacher edition extends the activity to include presenting and explaining their project to the class. The teacher materials also specify key ideas to communicate, including system components, the flow of electricity, and the interdependence of the parts on one another. The student materials lack an introduction to argumentation or a focus on using evidence to support a claim. The materials do not extend many opportunities for students to learn and practice skills in argumentation, such as debate, critique, or justification. One of the limited options for students to research and communicate information is in the student Textbook, where students explore past life and fossilization. The materials then request students "use appropriate information texts to support your analysis, reflection, and research completed during the investigation." However, the resources lack student guidance to develop evidence-based arguments. The materials do not explicitly offer structure to students to construct claims based on data or information gathered from the investigation.
- The materials integrate some discourse within stages of the learning cycle but do not integrate intentional argumentation into the learning cycle. In Chapter 4 of the Learn By Doing STEAM Activity Guide Teacher Edition, Activity 7, students use the scientific method "to demonstrate the Law of Conservation of Matter" using water, soil, and vegetable oil. Students "write a hypothesis on what they think will happen after they mix water and soil, and water and oil and why." during the hypothesis portion. After conducting the investigation, "students describe their results." The materials provide teachers with guiding questions to ask that include, "Were they able to demonstrate the Law of Conservation of Matter." The guidance then states, "Use this as an opportunity to discuss hypotheses, theories, and laws in science." The following information is complex and not grade-appropriate as it includes such prompts as "Scientific laws describe phenomena and are supported by a vast body of scientific data. They differ from theories as they describe phenomena, while theories explain why phenomena occur." This guidance does not support students' development or use of argument or discourse. Finally, the analysis and discussion of results state, "This experiment models the Law of Conservation of Mass." This statement takes away the opportunity for argument as it provides students with the answer. While the activity provides opportunities for an argument to be integrated, it is not clearly identified or described. The lesson focuses on the discussion and teacher lecture on the differences between hypotheses, theories, and laws in science.
- The materials integrate some argumentation and discourse within stages of the learning cycle. For example, in the Teacher Textbook, Unit 1, Scientific and Engineering Practices lesson includes guidance on cooperative learning opportunities. The guidance states, "At various points throughout the school year, as it suits your individual class, set up a cooperative learning interaction. Provide students with various topics, as appropriate to their abilities or shared experiences they have." Later, the guidance references students expressing "ideas and opinions." After completing a search of "Cooperative Learning Interactions," this guidance is found only here and not referenced directly in other lessons. This guidance references opinions but does not offer specific guidance on integration appropriate to individual lessons or how argument supports standards of individual lessons or units. The inclusion of Cooperative Learning Interactions is not intentionally used throughout lessons.
- Materials provide opportunities for students to engage in the practice of argumentation and discourse however, materials do not provide opportunities for students to develop how to

practice argumentation and discourse. For example, in the Teacher Textbook, the project-based lesson on chemical reactions students are to make observations and measurements to produce an argument from evidence. Materials offer limited guidance on how to do this but suggest students develop and use models, plan and carry out investigations, and conduct investigations. Materials provide opportunities for students to develop how to engage in the practice of argumentation and discourse. The Learn by Doing STEAM activity guide offers Design Engineering Challenges at the end of each chapter. Activity 9- spring scales ask students to use a spring scale to measure gravitational force. Materials provide a Design Engineering Process with steps, and explanations on how to complete the task. The steps are to ask what's the problem, imagine and design solutions, build the solution, test the solution, make it better, and communicate a successful solution.

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

- The materials do not provide criteria for developmentally appropriate arguments to explain a phenomenon or defend a solution to problems using evidence acquired from learning experiences. For example, in the reading comprehension activity from the 4th grade Learn By Doing book, students write a response to two different prompts about renewable and nonrenewable resources. However, the materials do not provide criteria for what should be included in each written response to demonstrate they understand the concept. The materials do not provide criteria for developmentally appropriate arguments to explain a phenomenon or defend a solution to problems using evidence acquired from learning experiences. For example, the 4th-grade investigation “Bird Feed” in the Teacher Textbook provides guidance for students to “choose one bird and present an argument for the feet and support with evidence.” However, neither the teacher nor students are provided with criteria for what should be included in this argument. The directions also do not specify whether the argument should be written or verbal.
- Materials provide some instruction for how to construct and present a verbal or written argument. In Activity 1- Open and closed circuits, students write their hypotheses (arguments) for the investigation. Students then use the guided questions from the teacher to analyze and discuss their data with their peers. Using the data and discussions, students must defend their hypothesis or explain why they were wrong. Materials provide instruction for constructing and presenting a verbal or written argument. In Activity 4- Speed and Velocity, students are given instructions for presenting their experiments and either defending their hypothesis or explaining why they were wrong using evidence.
- The materials provide some opportunities for students to justify explanations of phenomena and solutions to problems using written and verbal arguments to problems using evidence acquired from learning experiences. For example, the Organisms and Environments Unit in the Teacher Textbook includes an activity where “students test adaptations of different bird beaks to determine which bird beak is best suited for certain foods.” The “Additional Hints" section includes the statement, “After students have completed this activity, have them design their own animal, keeping in mind what physical characteristics they are adapted for. To assess, students must explain and justify the characteristics they added.” The guidance does not ask students to reference their investigation or any previous learning, though it can be implied. The student materials do not include this prompt, and it would need to be verbally given or an assignment created by the teacher. Due to its location in the lesson plan and lack of inclusion in

the student materials, it might be skipped or only used for some students, limiting the opportunity for students to justify explanations.

TPS STEAM into Science Grade 4

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

Partial Meets | Score 2/4

The materials partially meet the criteria for this indicator. Materials include some guidance to support student reasoning and communication skills.

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

Evidence includes but is not limited to:

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

- The materials provide some teacher responses to possible students' responses. The Teacher Program Guide recommends that students responding correctly be provided with "Level 2 assessment questions" from the "Online Library - Assessment tools" for the TEKS being taught and affirm comprehension. The guide continues to recommend that students responding incorrectly be provided with "Level 1 assessment questions."
- Additional suggestions to respond to struggling learners include studying keywords and using them correctly in a sentence, using "an arts project from the STEAM Activity reader book for relevant TEKS," and going back to "an earlier grade to ensure prior grade learning is completed."
- The "Project Based Lesson" found in the 3rd-grade Teacher Textbook includes a common preconception students may have about proportion. The materials provide the following teacher response example: "If you have two bananas and one orange, the quantity is two and one, and proportionally, you have double the amount of bananas than oranges." This type of support is not found consistently throughout the materials.
- The materials provide some teacher guidance to students' responses, including how to build on students' thinking. For example, Support Notes included in the Unit 2 lesson on Mixtures and

Solutions, from the Teacher Textbook, notes, “Students may struggle with the idea that a solution is a type of mixture because one of the materials which it is part of it has disappeared. There are two possible routes to solve this, either you could allow them to taste a mixture of sugar and water to ascertain that the sugar is still there, or you could separate a solution to show that it is made up of the original constituents.” The student materials do not ask any questions where they would need to support the claim that a solution of sugar and water is a mixture. The guidance supports science knowledge but does not clearly support the investigation materials provided to students.

- Materials provide teachers with some student responses to questions and tasks. For example, the Water Cycle unit materials have a table for students to complete, linking their investigation with the stages in the water cycle, with possible student answers.
- Materials in the STEAM Activity guide do not provide teachers with all possible student responses to questions and tasks. For example, in the Force, Energy, and Motion unit, students are asked a few questions to assess their text comprehension however, no possible student answers are present, the materials state, "answers may vary, check text for accuracy".

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

- The materials provide some broad guidance for the teacher on how to support students’ use of scientific vocabulary in context. For example, the Teacher Textbook lesson “How Can You Classify An Object?” suggests that if there are “words being used that a student may not recognize or understand, take the time to discuss such words in order for them to be added to student vocabulary.” Another lesson in the Teacher Textbook, “Properties,” includes guidance in the “ELL” section stating students should “practice describing objects in terms of the properties with a partner.”
- Each chapter in the Learn By Doing STEAM Activity Reader Book includes an activity for students to work with vocabulary words and terms. For example, in Chapter 8, Activity 8 of the Learn By Doing STEAM Activity Reader Book, the guidance provided for teachers is to review vocabulary “using the TPS vocabulary cards.” The purpose of this activity is “for students to understand [the words] meaning(s) and recognize them when spoken.”
- In the Teacher Program Guide, materials provide vocabulary strategies teachers can use to scaffold students' development of scientific vocabulary. Strategies include how to create and maintain a word wall and strategies to help students deepen their understanding of the vocabulary words. In the Teacher's Textbook, the lesson on The Rock Cycle supports teachers by giving them the key vocabulary words before the start of the lesson. Materials also tell the teacher how the vocabulary will be presented to the students and suggestions on how to implement the vocabulary.
- The Learn by Doing STEAM Activity Reader Book offers a story addressing lunar cycles and weather vocabulary. The text contains many terms throughout. After the reading, students respond to comprehension questions and conduct investigations. The materials also provide a list of vocabulary terms at the end of the chapter for review. The materials do not contain scaffolds throughout the activities to support the use of the vocabulary or to assist the teachers with scaffolds.
- The materials provide some embedded support for the teacher in how to introduce and scaffold students’ development of scientific vocabulary. For example, the Teacher Textbook lesson on Changes guides teachers to display pictures of all three states of water with the following guidance, “Show students the images… Ask questions to remind students of work done in

previous grades on states of matter and how matter changes from one state to another. Remind students of all the associated vocabulary." The materials provide a short list of example questions. While the guidance does not include "all associated vocabulary," teachers could locate it in "Key Terms" of the student materials section.

- The materials provide inconsistent embedded support for the teacher in how to introduce and scaffold students' development of scientific vocabulary. For example, the STEAM Activity Guide provides a Science/ELA Word Wall Activity in Unit 4. Teachers are advised to use the TPS Crosscutting Library of photographs to include in a warm-up critical thinking exercise. The guidance states, "Have students choose a photograph which they believe is linked to evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation…. At the end of content delivery for this section, ask students to review the chosen photograph again. Were their initial thoughts correct? What have they learned?" This STEAM Activity Guide activity is intended to be used as an extension or additional lesson to support struggling students with scientific vocabulary development and does not occur during initial instruction of vocabulary.

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

- The materials provide some guidance that teachers can use to provide feedback to students while using evidence to construct claims. For example, the Assessment Guide provides a performance task within the Matter and Energy unit. The performance task asks students to "use a panel of tests and observations to characterize five different substances by their properties. Use your data to identify one of them as a mystery substance." The Guide provides a 4-point rubric. To score 4 points, students must "exceed all the required elements of the prompt." To score 3 points, students must "meet all the required elements of the prompt." The rubric continues to 0 points. The rubric does not provide how teachers can provide feedback to help students achieve 4 points. There is no list of required elements for teachers to reference or possible student answers.
- The materials provide some teacher support to prepare for student discourse. In the 4th grade Learn By Doing STEAM Activity Reader Book, teachers are prompted to "stress the importance of actively listening to other students during sharing and participating in discussions respectfully" during the analysis phase of investigations using the scientific method. In the 4th grade project-based lesson for engineering in the Teacher Textbook, teachers are prompted multiple times throughout the lesson to lead class discussions, but no teacher preparation is provided for setting up and reinforcing a class culture in which students are listening to and evaluating whether they agree with one another's ideas.
- Materials don't provide teacher questions for supporting student discourse and the use of evidence in constructing written and verbal claims. For example, in the Assessment Guide, materials ask teachers to "prompt" students into a certain way of thinking but don't provide question stems to encourage prompting. For example, the Teacher Textbook includes a Project-Based Lesson in Unit 5. Students investigate different types of bird beaks and the food they are best suited to pick up through the use of eating utensils, such as chopsticks. The investigation includes a questions portion. For example, "What type of food would the knife be best adapted for?" The Teacher Edition provides the following answer, "Answers will vary. Ensure students accurately support their answer." Materials do not provide additional guidance or possible feedback for teachers to use. The materials do not integrate teacher feedback to support students' use of evidence in constructing claims.

TPS STEAM into Science Grade 4

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

- The materials provide broad teacher guidance to engage students' thinking in various modes of communication. For example, a lesson on mixtures in the 4th grade STEAM Activity Guide prompts teachers to "ask students to think about their prior knowledge of evaporation" after students complete a written response. Materials continue to prompt teachers to "give the students time to have a full discussion about what they already know" and to "use this time to correct any misconceptions and answer any questions."
- The materials do not provide teacher guidance to engage students' thinking in various modes of communication throughout the year. For example, the Assessment Guide includes sample responses to "Focus Questions" for the lesson "Solving Problems." Materials do not include guidance on what scientific understanding is needed to develop these answers to help teachers facilitate students showing their thinking in written form.
- The materials provide resources to facilitate student thinking in the activity Stream Tables. After conducting an investigation, students received several questions, including, "What were the parts of the stream table, and how were they interdependent?" The questions assist students in processing their thinking before they engage in discussion with the class. The materials offer additional questions to support teachers throughout the discourse. An activity addressing energy provides an opportunity for students to communicate their findings and presentation. However, the materials do not guide teachers or students in communicating the information. Instead, the materials offer directions for the presentation, such as "They should present their research to the class in a short, two to three-minute presentation."
- The materials provide some teacher support for facilitating the sharing of students' finding solutions. Materials do not consistently provide feedback tips, and examples teachers can use to support students throughout the learning cycle. For example, the STEAM Activity Guide includes a Word Wall Read Aloud Activity in Unit 4. Students work in small groups to "design a renewable energy house." The Teacher Edition provides the following support; "Have each team create questions a house buyer might ask about energy being used. Include both verbal and written statements using multiplicative comparisons and multiplication equations supporting the energy type's use as compared to non-renewable energy types." While the activity allows students to work with others and share their ideas about planning a test, the materials provide no teacher support to facilitate the sharing of student findings. Teachers can locate a general description of the DAPIC process in the back of the Teacher Program Guide as a scaffold.

TPS STEAM into Science Grade 4

Indicator 6.1

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

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

Meets | Score 2/2

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

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

- The Learn by Doing STEAM Activity Reader contains checks for understanding throughout the resource. Some idea boxes within the reading provide questions for the teachers to pose to the students. For example, Idea Box 1 in the chapter Mystery Artist states, "Ask the students to write about how they use water every day. Ask them to describe whether it is liquid, solid, or gas and why it fills the criteria for its state of matter. The materials do not pair the idea box content with prompts for teachers to listen to discussion, checklists, or rubrics to identify responses indicating mastery. The materials extend informal assessments throughout the Learn by Doing STEAM Activity Reader. The chapter, National Park Field Trip, Rocks, and Soil! Includes an idea box prompting teachers to "Ask students to come up with a flow chart that shows an example of weathering and erosion."
- The materials provide multiple assessments in the Assessment Guide. For example, the Force, Matter, and Energy unit in Grade 3 contains three “Science Assessment Questions.” The assessments contain a variety of formats that include multiple choice questions, open-ended questions, and performance tasks. For example, a performance task in the Force, Matter, and Energy units asks third-grade students to design a gate latch that can be opened and closed with a magnet. In the “Amelia Rose Explores Matter and Energy” lesson in the STEAM Activity Guide,

teachers ask 3rd-grade students “if they know how to weigh things correctly.” Teachers are directed to “have students show” their ability using the “combined rocker scales.” Teachers are then directed to discuss the physical properties of matter that could be tested using the materials in the story.

- Materials provide diagnostic assessments. The Teacher Program Guide contains a section called Support Notes for Teachers. Within the Support Notes for Teachers segment in the TPG, there are frequently asked questions with answers. Question 4 in this document asks, "Where are the TPS diagnostic, formative, and summative assessment tools?" The responses state that for the Diagnostic assessments, "the interactive software tool provides automated grading for multiple choice questions; Benchmark tests (Level 1, 2 and 3 Assessments) in Online Library - Blackline Master." Materials discuss the Benchmark tests included in the program. Benchmark 1 test assesses natural knowledge at the term's commencement before any program content. Benchmark 2 test is TEKS-based and set by teachers for TEKS taught on the examination date. Benchmark 3 test is the end-of-term test covering TEKS taught by a date given. Benchmark 4 is the end-of-year test to review skills by students by TEKS for all TEKS. Although the Program Guide states that there are four benchmark assessments, grade 4 materials provide two benchmark assessments in the Blackline Masters.

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

- Materials indicate which student expectations are assessed. For example, materials provide both the TEKS correlations for each assessment item and the answer keys for every assessment. In the Assessment Guide, TEKS 12C has open-ended and multiple-choice assessment questions with the answers. Materials indicate which student expectations are assessed. For example, materials include an assessment table in each unit overview that lists all assessments for the unit but doesn't specify which student expectations are assessed in each assessment. The Scope and Sequence provides an overview of all TEKS in each unit, as well as textbook references for those TEKS. The references tell teachers where to find materials for those TEKS throughout the program, like assessment, but do not specify which TEKS listed are included in the assessment.
- The assessment database lists TEKS above each item. Assessment items indicate only one standard per assessment question/task. Several assessment items assess more than one TEKS. The materials assess all student expectations, as outlined in the TEKS. The materials include an assessment generator that includes at least one question per expectation. Each lesson in the Teacher Textbook identifies the TEKS that are assessed in formative and informal assessments.
- The materials include a content guide that provides information on how TEKS 1- 5 are integrated into lessons. Materials do not include a TEKS 1-5 content guide for grade 4.

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

- Materials include assessments requiring students to integrate scientific knowledge and science and engineering practices with recurrent themes appropriate to the student's assessment expectation. For example, in the Learn by Doing STEAM Activity Guide, the assessments integrate scientific knowledge through informational fiction, science, and engineering practices Activity 7 is represented through students building a model of the Earth's and Moon's orbit. Lastly, it focuses on the transfer of heat energy. Materials include some assessments requiring students to integrate scientific knowledge and science and engineering practices with recurrent

themes appropriate to the student's assessment expectation. For example, in the Learn by Doing STEAM Activity Guide, Chapter 6 , the assessment integrates scientific knowledge through informational fictional short stories, Activity 2 integrates science and engineering practices by having students design and build a tower, and recurring themes are present in Activity 7 with landforms.

- The assessment generator provides a tool to select standards, science and engineering practices, recurring themes and concepts, and core content. The materials display items based on the standards selected. The Assessment Guide poses some questions in several formats. In the section based on focus, motion, and energy, the materials pose the free response question, "What kind of effects can magnets have on each other?" and a multi-select item, "Which of the following can pull an object closer or push it away without touching it?" However, the resources do not integrate or indicate the alignment of recurring themes and concepts or science and engineering practices.
- The materials include some assessments that require students to integrate scientific knowledge and science and engineering practices, with recurring themes appropriate to the student expectations being assessed in some ways. For example, in the Teacher Textbook, after completing a reading assignment on ecosystems, students “draw a diagram of a chosen habitat. The Teacher materials include some guidance that incorporates 3.5B, identifying and investigating cause-and-effect relationships to analyze problems. The TEKS 1-5 Content Guide identifies this performance task as supporting 3.5D, integrating the recurring theme of cause-and-effect relationships with scientific and engineering practices. However, the Teacher Textbook does not directly label 3.5B in the standard as an assessed standard.

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

- The Assessment Guide provides activities that address content in new and novel forms using multiple assessment options. For example, students complete a performance task to identify the properties of meats in the matter and energy unit. The materials also address other substances and mixtures. In the 4th grade, students collect data about weather and climate across Texas during instruction in the Teacher Textbook. The Assessment Guide includes a performance task for students to research the climate of another state with a contrasting climate. Students collect weather and climate data such as “temperature, precipitation, wind speeds, and hours of sunshine,” create a data table to show the comparison between both locations and create an appropriate graph with both sets of data. Beneath the data table, students are directed to write a paragraph “to compare the climates in their own state with that of the other.”
- Materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. For example, in Learn by Doing Chapter 8, students first observe how plant growth is affected by the soil it's grown in. Next, students investigate and explain how producers can make their own food. Materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. For example, in the STEAM Activity Guide, students follow the DAPIC process to assess their knowledge of force, motion, and energy. Students design and build a pinball machine, first using their knowledge of force and motion to build the structure, then their knowledge of energy to add lights and sound to their game.
- Materials include assessments that allow students to apply knowledge and skills in a variety of contexts. For example, after students investigate mixtures and solutions in the Student Textbook, they can be provided with Science assessment questions in the Assessment Guide. Students answer open-ended and multiple-choice questions and perform two performance

tasks. In the first performance task, students observe the chemical reaction of copper coins and lemon juice and write down an explanation. In the second performance task, students "demonstrate that mixing of two or more substances sometimes results in a new substance and sometimes doesn't, providing an explanation. Materials include assessments that allow students to apply knowledge and skills in novel ways. For example, in the Learn By Doing STEAM Activity Reader, students research the climate in their region of Texas to understand the difference between weather and climate. After completion of the activities, they can be provided with a performance task in the Assessment Guide. Students create a "pictograph to show typical weather conditions expected during a particular season and describe two other ways to model the same data."

TPS STEAM into Science Grade 4

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

Partial Meets | Score 1/2

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

Materials provide some information and/or resources that provide guidance for evaluating student responses. Materials partially 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. Some materials tools yield relevant information for teachers to use when planning instruction, intervention, and extension. Materials provide some resources and teacher guidance on how to leverage different activities to respond to student data.

Evidence includes but is not limited to:

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

- The teachers' editions inconsistently provide assistance for evaluating responses. The Learn by Doing STEAM Reader Book only contains examples for student responses to general questions that are to be investigated during a culminating activity for the content TEKS, located under the Assessment section of the guide's table of contents, but there are many activities in this guide that include no guidance for evaluating student responses. Each chapter in this Reader has multiple activities, sometimes as many as 8 per chapter, and there is no guidance for evaluating students' responses or performance in those activities. This is in sharp contrast to the Teacher Textbook, which offers guidance in red text for every student activity/question.
- Materials include some information that guides teachers in evaluating student responses. For example, materials provide guidance on what should be included in student responses when they explain how soils are formed. Materials also include an answer key for the "Test Yourself" activity in the Teacher Textbook. The STEAM Activity Guide includes possible student answers to a question about Earth's environment and resources. The materials provide sample student responses and some rubrics.
- Materials include some resources that guide teachers in evaluating student responses. For example, in the Assessment Guide for Grade 4, Teacher Edition, students engage in performance tasks, such as in 4.8B, whether they ask yes or no questions to get other students to determine

which piece of matter they have. The scoring rubric that is provided has a 3-point scale and says for 3 points, “Students participate fully, with accurate answers and logical questions based on previous questions and answers. Quick and knowledgeable identification of substances based on the information available.” This rubric doesn’t guide the teacher as to what “accurate answers” are or what the “logical questions” should be. The rubrics are often vague and not useful in guiding teachers to evaluate 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.

- The Graded Assessment Database offers three levels: Below, At, and Above to support teacher analysis of data. However, the materials do not guide teachers to analyze data or use the results to respond to students' needs. The database does not contain a tool for teachers to view data in a comprehensive format, data table graphic form. The materials extend sample responses and rubrics to assist teachers in evaluating student responses. Though present, the 4-point rubrics do not clearly articulate content-specific criteria. For example, the rubric recommends students receive 4 points for completely responding to the prompt correctly and 3 points for primarily responding correctly.
- Materials provide resources to support teachers’ analysis of assessment data. Materials include an Assessment Matrix that lists the knowledge statements for core concepts to support tracking overall data for students. Materials do not provide guidance documents to support teachers’ analysis of assessment data. The Assessment Database information found in the Introduction section of the Teacher Textbook states that “effective and efficient instruction relies on accurate assessment” but does not provide reference to any guidance documents or resources to support teachers in analyzing data to drive instruction.
- Materials provide some guidance to support the teacher's interpretation of the data. For example, student proficiency levels are labeled in multiple ways in different components of the program. The Program Guide refers to students as level 1, level 2, or level 3 learners in the Support Notes for Teachers section. Proficiency is described as Some proficiency, Approaching mastery, and Mastered on the Learn By Doing Assessment Rubric and in the STEAM Storybook Assessment Rubric information located in the Program Guide. The Report Card lists the following proficiencies: Novice (not yet evident), Intermediate (developing), and Expert (mastered). Materials provide varying assessment opportunities but do not consistently provide evaluation tools to collect data that can be used to respond to student-specific needs. For example, the Learn By Doing STEAM Activity Reader utilized the Scientific Method as an assessment tool. The materials provide guidance on implementing the Scientific Method in the Introduction but do not provide a rubric for teachers to evaluate student proficiency levels.

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

- The materials offer a matrix to assist with charting student progress and assessment performance. The materials require teachers to enter data into the matrix by student manually. With class sizes of 20 or more students, teachers will require significant time to chart data using the matrix. The assessment tool does not guide or offer recommendations to assist teachers

with planning instruction. The materials do not include support for instructional grouping based on assessment data or suggest content for review.

- The TPS Interactive Assessment Software Tool allows teachers to create and modify questions within the data bank to support differentiated instruction. Teachers have the ability to simplify language, as appropriate, and include exemplars for open-ended questions to help identify students in need of additional support. The STEAM Activity Guide includes teacher guidance to other product materials to support differentiated instruction based on student data. For example, materials refer teachers to the “TPS Reader Activity Books” and the “TPS STEAM Science/ELA/Math/PSHE Library” to support struggling or advanced students.
- The information gathered from the assessment tools helps teachers when planning differentiated instruction in some ways. For example, the Learn By Doing Assessment Matrix categorizes students into three proficiencies: Some Proficiency, Approaching Mastery, and Mastered. Teachers can use this information to assign below-grade level students Level 1 questions from the Assessment Generator, locating appropriate questions by TEKS, as stated by the Program Guide for below-grade-level students. The information gathered from the assessment tools helps teachers when planning differentiated instruction in some ways. According to the Program Guide, teachers have an Assessment Matrix to collect and enter student data. The Program Guide details that Benchmark tests, Focus Questions, and Performance Tasks should be entered into the Assessment Matrix and transferred to the report card. The Progress Monitoring section of the Program Guide does not provide guidance on how to use the tool to differentiate instruction. Teachers can refer to the guidance in the Teacher Support section to assign Leveled Questions from the Assessment Generator based on TEKS.

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

- The Assessment Guide offers review activities, performance tasks, and reteach assessments to assist teachers with direct instruction for using interventions. For example, the material states," [students] are to demonstrate, using their bodies and gym equipment as required, the effects of balanced and unbalanced forces on an object as required, the effects of balanced and unbalanced focuses on an object (which could be their own body." Resources such as Amelia Rose Explores components provide opportunities to leverage in response to student data. The materials offer differing reading levels to reinforce content and vocabulary-building activities.
- In the Learn By Doing Assessment Rubric to collect student data, categorize performance levels as Some Proficiency, Approaching Mastery, and Mastered. The Program Guide provides limited guidance on students who are considered Level 1. “Level 1 learners will require more time and content from STEM and arts projects in conjunction with story books.” Additionally, Support Matrices provide teachers with guidance on materials to use when supporting students but do not provide guidance as to how to support them. The materials do not guide which specific lessons or activities from the STEAM Activity Guide should be used for level 1 students who score Some proficiency on the Learn By Doing Assessment Rubric with TEKS 3.6A, measure, test, and record physical properties of matter.
- The materials provide some teacher guidance for responding to performance data. For example, the Teacher Program Guide directs teachers to “grade and insert results” for “Focus Questions” and “Performance Tasks” onto the report card. Materials include support to offer students with various needs in the activities found in the Teacher Textbook but do not guide teachers in responding to data. For example, the lesson “Solar System” directs teachers that “some

students will need to be directed to a specific site or page which contains all the information they need" rather than responding to the data collected from the activity.

TPS STEAM into Science Grade 4

Indicator 6.3

Assessments are clear and easy to understand.

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

Partial Meets | Score 1/2

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

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

Evidence includes but is not limited to:

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

- Assessments contain items that are scientifically accurate. For example, the Assessment Guide in 4th grade includes an assessment that accurately focuses students on the lunar cycle rather than the individual phases of the Moon. The Interactive Assessment Tool for 4th grade contains items that align with grade-level concepts in a scientifically accurate way. For example, an assessment item includes the examples of forces included in the student expectation as options to describe a classroom investigation.
- Material assessments contain items for the grade level that are free from errors. For example, materials in the Teacher's Textbook correctly described the flow of energy within a food chain, using the correct terminology and not omitting a step in the flow of energy process. In another assessment, materials accurately present all steps within the carbon dioxide-oxygen cycle.
- Assessments contain items that do not consistently avoid bias. For example, the Student Textbook contains an investigation embedded in the expository text of the “Name the Scientist” lesson. The text contains language and instructions that may be insensitive to students of diverse backgrounds. The language includes the following, “Ask students to choose a scientist from a different background to themselves and study the life and works of that scientist. Have students comment about how their work would inspire people of the same background and note how their work has impacted society.” The lesson includes a task that asks students to make assumptions about diverse groups.

TPS STEAM into Science Grade 4

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

- Materials use some clear pictures and graphics that are developmentally appropriate. For example, in Learn by Doing Chapter 3, materials contain images of a variety of animals and their young. Pictures are clear, focusing on the animal's traits; images are also labeled and in color. In Learn by Doing Chapter 8, materials include pictures of life cycles. Pictures represent each stage of the life of a plant and ladybug; arrows are present to show the cycle, and each stage is labeled. The Student Textbook contains two electric circuit diagrams in the "Test Yourself" assessment of the "Electricity" chapter. The graphic contains clear symbols of the parts of a circuit, including a battery, bulbs, and switches. Students use the graphic to answer multiple-choice questions. Before the assessment, students practice drawing electric circuits with the symbols.
- Assessment tools use some pictures and graphics that are not clear. For example, a "Science Makers" task on seasons from the Assessment Guide includes a "seasons graphic model" that includes text that is not easily read. In an assessment on fossils as evidence of past environments, the Assessment Guide includes a diagram of "a whale's evolution" that is easy to read but is not developmentally appropriate for 4th-grade students.
- The assessment database for grade 4 contains 234 questions at grade level. The items do not include any visuals despite addressing complex and broad content. For example, the materials include the question, "Describe how the energy in a tertiary consumer is cycled if it is not hunted or consumed." The question does not contain a food chain, related diagrams, or images.
- Some assessment items contain graphics that are not developmentally appropriate for grade 4 students. For example, the Student Textbook contains an investigation of mixtures and solutions. Students collect data and then represent it in a graphic. The Textbook provides examples of graphics above grade level, including a tree map that uses "rectangles of different areas to represent data. The area of the rectangle is proportional to the quantity of data it represents." The example contains non-uniform-sized rectangles. Using the graphic requires students to have a representational understanding of equivalent fractions in visual representations.

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

- Materials provide some guidance to ensure consistent and accurate administration of assessment tools. The "How to Use the Assessment Generator Tool" video walks teachers through creating an assessment with this online tool. It also provides some ways that teachers could use a created assessment with students that include printing or displaying for the group or class to complete. Materials do not include information about how to administer assessments. Materials include reminders or tips that give suggestions for the time allotted to complete some of the assessments. Not all assessments include time allotment suggestions.
- Materials offer assessment administration guidance inconsistently. Items in the database offer directions for multiple audiences without implementation support. For example, item #173 states only to "identify a cause and effect relationship in nature." while #131 says explicitly, "Work alone. Identify two renewable resources." Another item, #134, tells students to work with a partner. The materials do not provide consistent guidance for students or teachers. The Assessment Database does not include directions or similar guidance in any part of its online assessment platform. The entry screen provides options for teachers to select TEKS-aligned questions, choose the level of questions, and show the answers.

- Materials include some information that supports the teacher's understanding of assessment tools and their scoring procedures. For example, the Program Guide states, "Teachers are provided with a teacher assessment matrix where they insert grades for relevant assessments, by TEKS by the student." The assessment matrix includes TEKS 6 - 13 but does not break each one down into all of each standard's parts, such as 6A, 6B, 6C, and 6D. Information includes a description of the TEKS, the unit the TEKS covers, and a table to input student names and scores. There is no place in the matrix to input names of specific assessments or information on scoring procedures for different assessment types, such as performance tasks and Benchmark tests. Materials do not include information on how teachers are to use the matrix once data is recorded.
- The Teacher Textbook provides a summary of the Assessment Database. The guidance states, "The Creative Science Curriculum encourages two types of assessment: visual lesson plan activities and quizzes/tests." Materials state teachers can conduct visual assessments by "watching students perform activities, such as found in STEM Project Editions or Arts Projects." Materials do not provide any checklists of criteria for scoring or recording visual assessments.

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

- Materials include an assessment generator teachers use to create assessments with certain TEKS in one of three test format options–using questions identified as below, on, or above grade level for each student's expectation. Teachers can assign assessments they create to individual students. While materials offer differentiated assessment options, materials do not include student assessment tools such as speech-to-text for answering written response items, visual clues such as color-coding text within test items, or text-to-speech features that enable students to hear text read aloud.
- The grade 4 assessment database does not include digital accommodations for students to demonstrate mastery while taking online assessments. The paper preview of the assessment database also does not reflect tools to provide accommodations. The materials do not provide accommodations to assist students with demonstrating mastery of knowledge and skills as outlined in the TEKS. For example, question #149 of the grade 4 assessment bank asks, "Describe how Watson and Crick's discovery of DNA impacted science." without additional support, context, or expectations within the TEKS.
- An assessment activity in the Teacher Textbook asks students to draw and label a diagram showing how the carbon dioxide-oxygen cycle works and then describe why the cycle is vital to plant and animal survival. One accommodation appears in the teacher guidance under "ELL," stating, "If students do not have the grasp of English to complete the Textbook Work involved in the Investigation, allow them to express themselves verbally and ask someone to transcribe their words." Materials do not provide alternate assessment accommodations for students to show mastery of content, such as text-to-speech, visual supports, or verbal responses. The materials state results can be input into the assessment matrix but do not reference how the matrix aids in accommodations.

TPS STEAM into Science Grade 4

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.	PM

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 some scaffolds and some 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 do not ensure teachers can target instruction to develop precursor skills necessary to access grade-level content. For example, the Teacher Textbook lesson, in Unit 1, on "Tools" provides the teacher with the following guidance in the "Scaffolding" section; "The work in these standards builds upon experiences and background that students may have had for more common tools before they arrived at school. Most students, for example, should know paper cups, sand, and soil. If students do not yet have this background knowledge, give them the opportunities to gain before commencing the standard." The materials do not provide what tools students have worked with in previous grades, nor do the materials provide embedded guidance on what activities would build this precursor knowledge. Later in the lesson, the materials provide guidance on building newly acquired vocabulary knowledge to be used throughout the rest of the year, stating "Throughout the lesson, ensure students work to internalize new basic and academic language. In order to do this, encourage them to use, and repeatedly reuse, such language meaningfully during both speaking and writing activities, which work towards building concept and language attainment." This note and list of keywords appear at the end of the lesson plan, after the introduction and activities.
- Materials provide some additional resources for differentiation to support students who have not yet achieved mastery. For example, the Teacher Guide contains teacher advice on NASEN-approved projects, which are "particularly useful for far below grade students, ELL, and special education users." Materials provide additional resources that attempt differentiation to support students who have not yet achieved mastery. The Intervention Focus Tutorial breaks the content into smaller chunks, but it is the same text and activities that appear in the textbook.

- The Support addressing magnetism provides some prompts to activate and use prior knowledge. The section states, "To predict whether metals are magnetic, they will have to guess, but they could also think about the uses of the objects or their experience of handling them." The ELL section likewise encourages students to "use prior knowledge and experiences" in addition to practice. The general statements extend broad recommendations for differentiation without specific, targeted strategies or accommodations. The materials support targeted instruction for students who have not mastered the content. The Teacher Textbook, specifically, contains a section titled Support, in which the materials describe the connections students need to make between a model of the water cycle and the processes that occur in nature. The section also details discussions with students to assist metacognition and identify skills that can help support or accommodate any difficulties with text.
- Throughout the resources, most guidance is general and does not target instruction to support mastery of the current content. For example, the materials recommend the teacher "Encourage students to feel more comfortable asking for help." and "If students struggle to recall exact vocabulary, have them describe the word. “The broad suggestions do not support teachers in scaffolding learning of specific scientific TEKS or concepts.

Materials provide enrichment activities for all levels of learners.

- The materials extend enrichment for all students through ELA/Literacy and Math Connections. The materials encourage students to consider the content application in other ways, allowing students to lean on stronger or preferred subjects. An example in Matter and Energy in the STEAM Activity Guide asks the students to conduct short research projects that use several sources to build knowledge in the thorough investigation of the different aspects of a topic" as a bridge to literacy. For mathematics, the materials ask students to "model with mathematics'' or "reason abstractly and quantitatively." The supports provided further in the text ask students to create a poem using vocabulary words and construct a pictogram, which are general for ELA and mathematics, respectively. The materials extend enrichment opportunities to students at all levels through target research that connects to the content addressed in the story. In the Science/ELA Word Wall Activity, the students refer to the class content to locate specific quotes that describe scientific concepts such as heating and changes in substances.
- Materials provide enrichment activities that account for learner variability. For example, each chapter includes a variety of activities that appeal to students' interests and abilities. The chapter "Why do I look like my parents?" consists of seven activities: activity 1, students interpret a graph; activity 2, students draw self and family portraits; activity 3 focuses on reading comprehension; activities 4 and 5 focus on math; activity 6 focuses on exploring and describing traits, and activity 7 on vocabulary. Each chapter in the Learn by Doing STEAM Activity Guide provides readings to encourage all students to make connections, learn about the chapter concept and standards, and integrate mathematical practices where applicable. For example, in "Why do I look like my parents?" students make connections using Idea boxes by discussing how babies in their families are taken care of, and students use mathematical practices to conduct a survey on inherited traits and create a bar graph.

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

- The lessons include some recommendations for just-in-time scaffolds to productive perseverance of learning at the moment, but lack guidance to illustrate for teachers what just-in-time learning acceleration is or how to best modify the provided scaffolds and activities to

best meet student needs. Grade 4 in the Learn By Doing STEAM Activity Reader Book includes idea boxes within the text that provide prompts and cues to maintain engagement. For example, in Chapter 9 “Survival”, idea box 2 prompts teachers to “share a migratory map for a specific animal with students” and “discuss how far the animal has to travel and the reasons for the animal migrating.” However, the recommendations are not as present in the materials enough to offer true guidance to the teacher in how to utilize the materials in a way that would provide critical just-in-time learning acceleration for all students.

- The materials, while providing a plethora of activities, do little to guide teachers in what just-in-time learning acceleration is or how to use the activities or modify them to better meet the needs of students where they are.
- The materials provide some scaffolds and guidance for just-in-time learning acceleration. However, In the STEAM Activity Reader Book, in Chapter 3, Why Do I Look Like My Parents? There is extensive text and seven activities for students, but there were no references to just-in-time learning acceleration or any scaffolds or guidance for how to support students who have learning gaps. This is also true in the following chapter, Chapter 4 Cooking is Science!
- The materials provide some scaffolds and guidance for just-in-time learning. However, in the STEAM Activity Guide teacher edition, specifically the store “What’s Done is Done!, there are no teacher suggestions for scaffolds or guidance for how to provide just-in-time learning acceleration for students, whether students need support with texts or the activities.

TPS STEAM into Science Grade 4

Indicator 7.2

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

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

Partial Meets| Score 1/2

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

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

Evidence includes but is not limited to:

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

- The Teacher Textbook includes diverse opportunities with developmentally appropriate instructional approaches to help the students achieve mastery. An example in the chapter, Force, Motion, and Energy, offers on-level expository text, guided research, and investigations to support students. The materials extend various grade-appropriate instructional approaches to engage students with the content. Examples include small group investigations, class readings with periodic questions, and exploring concrete examples. The chapter on matter and energy asks students to investigate objects in their classroom to create a poster describing physical properties.
- Lessons present opportunities for student-led investigations. In the Teacher's Textbook, students design an experiment to test the effect of force on an object. Materials engage students in the mastery of the content through a variety of developmentally appropriate instructional approaches. For example, lessons include connections to scientific concepts in the real world. In the Teacher's Textbook lesson on energy transformations, students investigate how music is made by an object colliding with another with the changes in energy.

- Materials engage students in mastery of the content through a variety of developmentally appropriate instructional approaches. For example, in Chapter 6 of the Learn By Doing STEAM Activity Reader Teacher Edition, students engage in multiple activities to support the following essential science content; The water cycle and weathering, erosion, and deposition from water, wind, and ice. Teachers read aloud a narrative text, introducing the science concepts as a class faces their first day of winter and the science activities that occurred as a result of the discussion. Students engage in multiple activities relating to the text concepts. In Activity 1, students engage in reading comprehension through a series of questions relating to the text. In Activity 2, students “draw, label, and describe the water cycle.” In Activity 3, students engage in the scientific method to investigate the “presence of water vapor.” In Activity 6, students review key science terms related to the content. The lesson includes hands-on investigation, modeling and drawing, discussion, reading, and written work.

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

- The STEAM Activity Guide recommends varying groupings to support students as they progress through instruction. In the activity, Die Cutting Exercise, students observe the changes in the state of candles and water as a class. The students then investigate other physical changes independently. The lesson resources in the STEAM Activity Guide support different student groupings, such as independent work, class discussion, and small group investigation. For example, the materials ask students to get into small groups to review a story and determine how they can mimic the child's actions to explore physical properties independently as homework.
- The materials support a variety of instructional groupings during the lessons. Lessons on core content involving text in the Teacher Textbook are provided to the whole group, while investigations frequently provide suggestions for small group and individual work. For example, in an investigation on the conservation of matter, the student directions say to “collect the items above for your group” and then also tell students to “record your answer” in the space provided. The materials support a variety of instructional groupings. A lesson on energy in the STEAM Activity Guide suggests student groupings during different activities. For example, suggestions are provided for small groups during an engineering design activity, for small groups then whole groups during a word wall activity, and then for pairs in a student activity.

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

- The materials inconsistently support multiple types of structures, and they lack clear teacher guidance. The Program Guide's Support Notes for Teachers provide some detail on how the program starts with the Learn by Doing STEAM Activity Reader Book, which teaches literacy with science. The materials state teachers should use the textbook, which includes expository text, investigations, assessment materials, and literacy and math-connected challenges. Furthermore, the STEAM Activity Guide offers aligned STEM and Arts activities and an engineering practice project. The Support Notes for Teachers in the Program Guide give an overview of each program piece, its contents, and the sequence of materials. However, the teacher materials do not specify how the program supports modeled, guided, and collaborative practice. The materials offer multiple types of practices but lack guidance and structures for achieving effective implementation.

- The materials provide some general guidance to recommend the Design Engineering Process to support students' communication. For example, the resources state, "During the sharing phase, encourage the children to actively listen to other children and participate respectfully during discussions." However, the materials do not offer detailed structures for implementation. Additionally, the recommendations are not content-specific without relevant support for teachers.
- The materials provide teachers with some guidance for the implementation of multiple types of practices but do not provide structures for implementation. For example, the STEAM Activity Guide provides teachers guidance on a STEM project where students create pinball machines. The beginning of the lesson includes an overview of the objective with helpful details such as, “A good rule of thumb is that a pinball machine should be about twice as long as it is wide, and the playing surface should be at about a 10-degree angle.” The lesson provides a step-by-step text, guiding students in building their pinball machine. The Teacher Edition provides additional guidance for each step. The lesson is broken up into sections that include “Explore It,” where students build components of their pinball machine; “Describe It,” where students respond to questions about their exploration; and “Use It,” where students reflect on their build. Materials do not provide structures for assessing student mastery of content knowledge nor label specific standards to each part of the pinball machine build. It is unclear how this STEM project supports the content standards. However, the materials do not provide resources for the teacher that specifically focuses on the different types of practice and how to most effectively implement.

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

- Materials represent diverse communities using information that is respectful and inclusive. For example, information in teacher guidance documents and student materials portrays a diverse group of scientists and engineers as outlined in the science and engineering practices. Materials represent diverse communities using information that are respectful and inclusive. For example, the information provided in the “Learning Strategies and Scaffolding” section of a lesson on the physical properties of rocks references that “some minerals are highly prized by particular cultures, like turquoise for Native Americans or jade for Chinese and Japanese cultures.”
- In the STEAM Activity Guide, the names of individuals presented in the short stories equally include male and female names and represent individuals of diverse backgrounds. For example, in the story What am I? The main character is a woman named Marion who is working on her homework on properties. The next story is called Kevin's Review, where Kevin is now the main character. Images reflect the diversity of school communities and match the content. Characteristics vary in images to include race and ethnicity, skin tone, and hair texture. For example, in the story Amelia Rose Explores, the image of Amelia and her Girl Scout troop represents a diverse group of girls of different races.
- In the Learn By Doing STEAM Activity Reader, the short story reader “Thanksgiving Trail Mix,” features characters that represent individuals of diverse backgrounds including gender, ethnicity, and cultural tradition. Materials represent diverse communities using images and information that are respectful and inclusive. For example, in the Learn By Doing STEAM Activity Reader, the main text includes information and characters that represent diverse backgrounds, including ethnicity, race, location, and gender. For example, the text represents a character who represents Indigenous Native Americans.

TPS STEAM into Science Grade 4

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

Partial Meets | Score 1/2

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

The material partially includes guidance for linguistic accommodations (communicated, sequenced, and scaffolded) commensurate with various levels of English language proficiency as defined by the ELPS but materials do not encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English.

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

- The materials include some linguistic accommodations as defined by the ELPS. For example, the Grade 4 Teacher Textbook suggests students "use language they find accessible," They also advise teachers to "encourage the practice of using new essential language." These are paraphrased expectations found in the ELPS for learning strategies. They do not specify how different levels of proficiency are appropriately supported by these actions. The materials do not specify how different levels of proficiency are appropriately supported by these actions. For example, in the lesson "Earth's Changing Surface" in the 4th-grade textbook, accommodations are provided for ELLs to "write a glossary" of different types of landforms. Students should also "use specific language (such as keywords) to express what they are asking." These are paraphrased expectations found in the ELPS for speaking and writing. While the materials cite the ELPS and include some teacher guidance, this guidance does not extend to differing levels of English proficiency.
- Materials include some linguistic accommodations for ELLs at the end of each lesson but lack authentic linguistic accommodations commensurate with various levels. For example, in the Teacher's Textbook project-based lesson on Energy Transformations, ELL support suggests that teachers discuss energy used in the classroom and compare it to the USA classroom to a classroom out of the country. Also, the lesson on Plant Needs suggests that ELLs are allowed to express their ideas verbally or draw.
- Materials include some guidance for linguistic accommodations (communicated, sequenced, and scaffolded) commensurate with various levels of English language proficiency as defined by the ELPS. For example, the Program Guide states, "Teachers are asked to use Archway, a phonics program, and dual language glossary cards. The materials encourage strategic use of

students' first language as a means to linguistic, affective, cognitive, and academic development in English." The Archway program is a phonics program and does not support guidance on linguistic accommodations for science content or the Learn By Doing Steam Activity Reader. The online resources provide a set of picture glossary cards that include an illustration, an English definition, and explanations of phonics concepts related to science vocabulary, such as, "sound waves is 2 words. Sound has 2 vowels and 3 consonants." The online library provides a set of glossary cards in Spanish, however, the cards do not include any English translation or graphic images. The materials are the same across 3rd, 4th, and 5th grade. The 5th-grade picture glossary cards include more words than the 3rd and 4th-grade picture glossary cards.

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

- The materials do not reference students' first language within the STEAM Activity Guide Student edition, even when extending students an opportunity to make meaning of new concepts. For example, an activity addressing soils in Amelia Rose Explores includes an area for students to draw and write. They do not provide any linguistically differentiated support. The STEAM Activity Guide does not encourage ELL students to use their first language to support concept development. The materials offer support in the form of word banks with definitions.
- The materials do not strategically use students' first language to assist with their English language development. For example, in a 4th-grade lesson on Earth's rotation, teachers are prompted to "discuss with ELL students the lengths of days that they experience in their country of origin." The materials do not consistently encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English. For example, teachers are prompted to "use the Spanish glossary cards to assist relevant students." This reference is only made in the early lessons of the textbook and not made again.
- The Learn By Doing STEAM Activity Reader Teacher Edition does not provide any guidance on first language use during the whole group instruction. For example, in Chapter 5, Idea Box 1 states, "Discuss any experiences that the students have had where they have offered to help someone in need of help. How did they feel afterward, and why?" While this activity does allow for the use of a student's first language, there is no guidance to support its use. Specifically, there is no guidance on how emergent bilingual students will communicate their personal experiences using translation software, peer support, or sentence stems. Therefore, the use of a first language is not strategic as a means of linguistic, affective, cognitive, or academic development.

TPS STEAM into Science Grade 4

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.	PM

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials partially guide fostering connections between home and school.

Materials provide information to be shared with students and caregivers about the program's design. Materials provide information to be shared with caregivers for how they can help reinforce student learning and development. Materials include some 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 students and caregivers about the design of the program by providing a Family/Caregiver Program Guide. The Family/Caregiver Guide details elements of the program and the purpose behind its design. One element described is practical approaches to teaching and learning science and the benefits of understanding how to "confront scientific arguments, advances, and associated technologies in their daily lives." The materials list everyday science applications that will support students as they grow. The guide continues to address TPS's pedagogical approach, "[using] storytelling as its main strategy," including a reference to research that says, "Students learn best when they enjoy the way a lesson is presented." The Family/Caregiver Guide describes research-based strategies considered as TPS developed the program. The materials cite evidence such as "Social lessons improve student learning." and "Students learn in different ways, so the content must be presented that attaches the visual kinesthetic and auditory senses." The research references assist families with understanding the design of the program.
- Materials provide detailed information to share with caregivers about the design of the program. For example, the program includes a Family/Caregiver Guide. The guide includes a list of TEKS from K-8, allowing caregivers to review the standards that will be covered throughout the course of the year. Materials provide information to share with caregivers about the design of the program. For example, the program includes family online access. The Family/Caregiver Guide provides screenshots of the online access and lists components caregivers will see, including digital access to homework. The guide also provides online resources for students and caregivers to gain more information about what the program provides. The guide consists of

pages illustrating the components of the student edition and the sequence followed in each lesson.

- Another example includes "Philosophy of Science Teacher and Learning," which provides examples of how "Science is more than memorizing facts. It is a way of organizing and understanding the surrounding universe." The materials provide information to share with students and caregivers about the design of the program. For example, the Teacher Program Guide states that materials “provide caregivers with TEKS and ELPS information provided to share and discuss with students.”

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 Family/Caregiver Program Guide suggests parents/caregivers can offer to “help enforce some of the requirements of the TEKS at home.” The only strategy provided includes ensuring that “students wash their hands during classroom investigations” by reinforcing “this safe practice within the home.” Parents/caregivers are suggested to have children “tell you why they need to wash their hands frequently and discuss how sanitizer can be used even when they do not have access to soap and water.” The materials provide resources and strategies for caregivers to help reinforce student learning and development. Each lesson in the Teacher Textbook includes an “At Home” section with an activity caregivers can do with their children. For example, the 4th-grade lesson “Conductors and Insulators” suggests caregivers “talk about different materials which conduct or insulate heat” and encourage children to “investigate the materials his or her clothes are made from” to determine which are better insulating materials.
- The Family/Caregiver Guide and the Teacher Program Guide reference digital family access to resources shared to reinforce student learning. Both materials say, "Digital family access costs nothing" and mention online access can help families "with all homework assignments and [with] the lists of keywords and definitions.
- The materials provide information for parents and caregivers about ways they can reinforce learning and development. For example, the materials include a document titled How STEAM Content supports Teachers and Caregivers and provides introductory information for caregivers as well as concrete ways caregivers can support learning at home. For example, it provides the strategy of “Ask the students to define specific words and demonstrate them with an action or an example in a sentence.”
- Each Traditional Textbook Lesson in the Teacher Textbook has a “Homework” activity. For example, the Energy lesson in Unit 3 provides an activity instructing students to “complete a survey to find out about energy at home. They should spot one example of each type of energy: mechanical, sound, electrical, light, and heat/thermal..” In the Support section, guidance for caregivers can be found, stating, “Talk about energy in different forms, including mechanical, sound, electrical, light, and heat/thermal. Point out some uses of energy to your child and ask them to spot others."
- The materials encompass a comprehensive Family/Caregiver Guide designed to facilitate families in providing support for educational concepts within the home environment. This guide comprises grade-specific glossaries spanning from Kindergarten to 8th grade. Notably, the fourth-grade section of the glossary contains specialized content terms, such as "soil," alongside broader scientific vocabulary, like "texture." In addition, the materials include definitions corresponding to these terms. The glossary is structured in alphabetical order, devoid of any

categorical divisions based on content or unit. The resource contains K-8 TEKS (Texas Essential Knowledge and Skills), glossary terms, and other relevant elements contributing to the length of the 172-page resource.

Materials include information to guide teacher communications with caregivers.

- The materials do not include teacher guidance for communicating with caregivers. The “At Home” sections provided in the Teacher Textbook include possible activities for caregivers to do with students but do not include communication between the teacher and caregiver. For example, in the 4th-grade lesson “Weather,” teachers are provided two activities students could do at home with a caregiver. However, teachers would need to establish communication to share these activities with families. The materials do not include teacher guidance for communicating with caregivers.
- The lesson asks students to discuss with their families where the water comes from in their homes and where it goes after being used. Materials do not include teacher guidance for communications with caregivers. The Family Guide "states how caregivers might communicate with teachers and students. “The materials do not include information on how teachers should communicate with caregivers.
- The Family/Caregiver Guide and the Teacher Program Guide reference digital family access to resources shared to reinforce student learning. Both materials say, "Digital family access costs nothing" and mention online access can help families "with all homework assignments and [with] the lists of keywords and definitions. The same section also states, "TPS can be booked to run workshops to assist parents and teachers work together. . . " The note on the booking does not include pricing, requirements, or indication of the availability of such support to all students. The guidance offered to teachers is to “provide digital access to caregivers at the start of each term” but does not offer suggestions for establishing a relationship or inviting ongoing communication and partnership with caregivers.
- The Program Guide contains information about report cards available through the program. The materials detail how and what teachers should enter into this report card. However, the materials do not provide any guidance for communicating this information with caregivers. The report card is a document that must be handwritten for each student and includes areas for TEKS to be entered as well as a score for each marking period. Scores include Novice, Intermediate, Expert, and Not Introduced Yet. The report card provides no guidance on how teachers should communicate the progress of students with this information. The materials include suggestions of activities, or parts of activities that can be completed at home but do not include teacher guidance for communicating with caregivers about these activities. For example, in the Earth and Space Unit in the STEAM Activity Guide, an activity is provided in a Natural Science lesson where it states, “If students have access to the internet at school or at home, they can find out how their city or town compares to the three cities they just studied.” The materials provide no guidance on how teachers can communicate this suggestion with diverse caregivers, including assessing family internet access.

TPS STEAM into Science Grade 4

Indicator 8.1

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

1	Materials are accompanied by a TEKS-aligned scope and sequence outlining the order in which knowledge and skills are taught and built into 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.	PM
3	Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.	PM

Partial Meets | Score 1/2

The materials partially meet the criteria for this indicator. Materials include some 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 into the course materials. Materials somewhat provide clear teacher guidance for facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts. Materials provide some 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 into the course materials.

- The *Teacher Textbook* contains a Scope and Sequence. The materials include a table naming the unit, number of class periods, most TEKS, and "Textbook Reference." The materials also provide a "Pacing Calendar/Year Planner" with a month-by-month view to indicate when to teach content and the TEKS taught within the course materials, as well as when to spiral and review content throughout the year. The Scope and Sequence includes the TEKS addressed through grade 3,the scientific and engineering practices (SEPs), and recurring themes and concepts (RTCs) . The TEKS 1–5 Content Guide outlines which SEPs are aligned to lesson components.
- The material's Scope and Sequence shows the correlation between the content regarding the use of natural resources and SEPs addressing recurring strands and science and social ethics decisions. However, subsequent units do not list the remaining SEPs. Neither the Scope and Sequence nor the Pacing Calendar identify the application of the RTCs. The *Learn By Doing STEAM Activity Reader Book Teacher Edition* – Essential Content Guide lists Science, Math, and ELAR skills by chapter. The Essential Content Guide does not indicate spiraled science core content or review opportunities. Materials include an assessment generator teachers can use for developing spiral reviews of content.

TPS STEAM into Science Grade 4

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

- Materials do not provide clear teacher guidance for facilitating student-made connections across core concepts, science and engineering practices (SEPs), or recurring themes and concepts (RTCs). The introduction of the *Teacher Textbook* provides evidence of instruction. However, only the core concepts are referenced beyond Unit 1. The Essential Content Guide found in the *Learn by Doing STEAM Activity Reader Book Teacher Edition* provides a list of different science concepts that are found in each of the chapters along with reading and math concepts addressed. Materials list concepts, scientific and engineering practices, and recurring themes and concepts in the TEKS 1–5 Content Guide. The TEKS 1–5 Content Guide does not provide teacher guidance on facilitating student-made connections.
- The materials do not l provide clear evidence of connections made between core concepts, SEPs, and RTCs. Materials include an Investigations piece in the lesson plans, where students make connections to scientific and engineering practices. However, the materials do not include any teacher guidance for facilitating the connections.

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

- The Pacing Calendar/Year Planner specifies dates for "revision, assessment, and reteach" after each unit. Neither the Scope and Sequence nor Pacing Calendar references spiraled TEKS for review or core concepts for reteaching.
- Materials provide some suggestions for different knowledge and skills that are spiraled in through different activities and stations. The Additional Essential Content Guide in the *Learn by Doing STEAM Activity Reader Book Teacher Edition* provides a correlation of where core concepts are spiraled throughout the year. For example, the Chapter 1 lesson "Hit the Ball" provides correlations between Science "exploring the effects of force," Math "place value," and ELAR "text comprehension and discussion." Also, the *Teacher Textbook* provides connections to scientific practices as students conduct investigations, such as having students select the appropriate graphic organizer for data collected during a series of stations.
- The Additional Essential Content Guide in the *Learn by Doing STEAM Activity Reader Book Teacher Edition* provides a correlation of various science concepts being spiraled in throughout the year. In the *Teacher Textbook*, connections are made to the scientific and engineering practices 4A and 4B as students decide which graphic organizer is most appropriate for the data being collected in a series of stations. For example, a Chapter 8 lesson provides correlations between Science "energy flow in a food chain," Math "determining unknown whole numbers in multiplication and division problems," and ELAR "vocabulary." In addition to a lesson on explaining the impact of scientific discoveries, students work through a series of stations and select an appropriate graphic organizer and explain why it is the best way to show information.

TPS STEAM into Science Grade 4

Indicator 8.2

Materials include classroom implementation support for teachers and administrators.

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

- Materials provide overview documents to support teachers in understanding how to use all materials. In the Assessment Guide Teacher Edition, teachers can reference lesson plans with a sequence and pacing for lesson implementation that includes activity directions and discussion topics. Materials include directions for how to implement the lesson plan, including using given scaffolds and enrichment activities for the lesson. Materials also include a Teacher Support component within the Online Library of the learning platform. Supports include detailed plans for the delivery of lessons.
- The materials include an “Introduction” in the *Teacher Textbook* to support teachers in the first steps of using the materials. The textbook component includes expository text aligned to grade 3 TEKS. It also includes research-based instructional strategies such as cues, questions, and advance organizers, generating and testing hypotheses, and scaffolding instruction which are used in inquiry-based investigations called Science Is a Verb. The *Teacher Textbook* also includes

a project-based lesson that offers support to teachers by providing a hands-on enrichment activity with easy implementation, and differentiation tactics for special populations.

- The materials offer strategies to support student learning with the text through the use of literacy strategies. The *Learn by Doing STEAM Activity Reader Book* describes after- and during-reading discussions with the students, engaging them to use their new vocabulary expressively. The *Learn by Doing STEAM Activity Reader Book Teacher Edition* includes Idea Boxes that recommend class discussion and content extensions. Instances include guidance to connections between text describing energy and the importance of energy in everyday life. Another Idea Box suggests mind maps to visualize examples of stored energy. Also, the materials include references to support their activities such as seen in the "Third Grade Air Balloon," "Bowling Balls," "Race Cars," and "Frogs." The article, "Implementing STEAM in the Early Studenthood Science Classroom," follows the activity and several other resources.

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

- Materials in the *Teacher Textbook* and standard correlations are provided through scaffolding information across grade levels K–5. The correlations showcase what students should already know and are projected to learn throughout the lesson, as well as in upcoming grade levels. The Scope and Sequence Pacing Plan provides an annual view of how to deliver content throughout the year. The Scope includes a unit overview where the TEKS are aligned to each lesson.
- The Appendix of the *Learn By Doing STEAM Activity Reader Book Teacher Edition* lists chapters within the program and correlating science standards. The Appendix also includes a chart listing chapters and correlating Science, Math, and ELA skills students use, but no TEKS are listed in this portion. The Teacher Program Guide includes vertical and horizontal alignment information within the Learn By Doing component.
- The materials include cross-content connections, such as the Science/ELA Word Wall Activity. In this connection, students use the text to describe properties and identify key features of the story. The materials provide curricular connections between Science, Math, and ELAR, organized by chapter. The appendix lists each core content aspect, such as "construction and deconstruction of fractions," and indicates which section addresses it. In the *Learn by Doing STEAM Activity Reader Book*, the materials offer reading guidance to support students' text analysis and comprehension.

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

- Materials include a list of equipment and supplies needed to support instructional activities. The Assessment Guide Teacher Edition provides a list of materials needed for each portion of a lesson in the lesson. For example, materials include a list of supplies students will need to use to conduct an investigation testing magnetism. The materials do not include a comprehensive list of materials found in one specific location. However, teachers can view a list of materials needed for specific lessons in the *Teacher Textbook* in the different investigations. For example, a lesson to support models of the earth details items to create the model, including bread, peanut butter, and a foam meat tray. In a lesson testing the physical properties of solids, liquids, and gases include a comprehensive list of equipment and supplies needed for this task: similar-sized cups or mugs made of different materials, hot water, five cardboard lids, a timer, and a thermometer.

TPS STEAM into Science Grade 4

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

- The materials include a section in the *Learn By Doing STEAM Activity Reader Book* titled "Safety in the Classroom." The "Safety in the Classroom" section references hand washing, the use of safety equipment, and the appropriate using technology. The materials outline activities with preparation and activity considerations. A section titled "Activity" refers teachers to local school safety procedures, such as with the use of hot plates. Specifically, "Please implement your school's safety procedure when running this activity as the students will be working near hot plates." The instructional materials include a section called "Idea Box," which provides recommendations for implementing the lesson. Additionally, the final part of the box reminds both students and staff to follow safety policies.
- The materials provide teacher guidance for safety practices during the "Working Safely and Responsibly" lesson in the Assessment Guide Teacher Edition. The lesson provides opportunities for teachers to explain the importance of safety equipment such as safety goggles and expectations for being safe during an investigation. Materials provide some teacher guidance for safety practices in the *Teacher Textbook*. For example, in the lesson, teachers guide a discussion with students about safety for an investigation. This introductory lesson should take place at the start of the program of study so students can practice these ideas throughout the remainder of the year.

- materials to support the lesson, such as in Activity 4, "Light Transmission." The materials advise gathering wood, metal, paper, wax paper, and others for the lesson.

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

- The materials provide teacher guidance for safety practices during the "Working Safely and Responsibly" lesson in the Assessment Guide Teacher Edition. The lesson provides opportunities for teachers to explain the importance of safety equipment such as safety goggles and expectations for being safe during an investigation. Materials provide some teacher guidance for safety practices in the *Teacher Textbook*. For example, in the lesson, teachers guide a discussion with students about safety for an investigation. This introductory lesson should take place at the start of the program of study so students can practice these ideas throughout the remainder of the year.
- The materials include a section called "Safety in the Classroom" to refer teachers to the Texas Education Agency-approved safety standards. The resources highlight the need for safety equipment, specifically splash-proof goggles, and gloves. The materials provide safety recommendations to eliminate potential student exposure to mold while investigating decomposition. The instructional materials include a section called Idea Box, which provides recommendations for implementing the lesson. The final part of the box reminds students to use care when using lasers.
- Materials include some guidance for safety practices during investigations. For example, the materials provide safety practices during the "Working Safely and Responsibly" lesson of the Assessment Guide Teacher Edition which is completed at the beginning of the year. The lesson provides opportunities for teachers to explain the importance of safety equipment such as safety goggles and expectations for being safe during an investigation. Materials provide some

teacher guidance for safety practices in the *Teacher Textbook*. For example, the science background information provides teacher guidance on the importance of safety when using certain science tools during an investigation.

TPS STEAM into Science Grade 4

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 materials include guidance on scheduling considerations for covering required science content for grade 3. Materials provide support for scheduling considerations with the days provided for unit instruction. The Online Pacing/Year Plan includes a sample calendar to identify the instructional days needed for each unit. This pacing calendar also includes class days designated for revision, assessment, and reteaching. The Scope and Sequence document includes a column with the number of class periods, noted as 50 minutes needed for instruction. The materials include the number of days required compared to the total instructional days in the year. The monthly calendar support teachers as they schedule upcoming instruction.
- The Lesson Plan provides time stamp recommendations for the introduction, textbook work, investigation, and summary. The *Teacher Textbook* includes the time required for a lesson on the conservation of natural resources as needing 150 minutes or three 50-minute class periods. The materials include guidance on scheduling considerations for covering required science content for grade 3. For example, the Assessment Guide Teacher Edition includes the overall time required for a lesson on the use of science tools during investigations as needing 100 minutes or two class periods. In addition, a more broken down recommendation for different components within the lesson is provided, including the introduction requiring 30 minutes, textbook work needing 20 minutes, a minimum of 30 minutes for hands-on investigation, and 5 minutes for lesson summary.

TPS STEAM into Science Grade 4

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

- The grade 3 materials provide guidance for the implementation of the sequence of content that is recommended to be taught that is consistent with the developmental progression of science. The Scope and Sequence found in the *Teacher Textbook* provide a suggested sequence of units that follows the sequence of reporting categories outlined in the knowledge and skills (TEKS) for grade 3 science. For example, the lesson introducing mixtures in the *Teacher Textbook* builds on earlier learning of the physical properties of matter as students create mixtures based on the physical properties of different objects. For example, students complete a performance task after instruction on changes in the state of matter that occurred.
- The materials include a section called "Activities and Pacing" that describes the components of each chapter. It recommends teachers return to activities at a later time if students do not have the skill sets for mastery. The Appendix in the *Learn by Doing STEAM Activity Reader Book* breaks down the science concepts addressed in each chapter. Teachers can review the entire unit for a progression of content development. The Additional Essential Content Guide provides an alternate instructional sequence while maintaining an appropriate content progression.
- Materials in the *Teacher Textbook* strategically sequence the lessons on safety and equipment before students learn content. For example, a lesson on tools is the first lesson in the *Teacher Textbook*, following a series of lessons on Science Safety, then enters lessons on Scientific and Engineering Practices (SEPs), and finally, lessons on Matter and Energy. The Pacing Calendar in the materials from the *Teacher Textbook* offers options for adjusting the time spent on particular units without disrupting the sequence of content.

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

- The Pacing Plan/ Year Planner includes a complete August-May view reflecting how the course fits within a single school year. The STEAM Activity Guide includes a "vignette" activity and provides a day-by-day description of each activity. The breakdown informs teachers' decisions to prioritize lesson components or adjust due to time constraints. The Student Activity Guide includes a table of contents indicating the types of activities within the resource. Activities include art projects, word walls, natural science STEM projects, and literacy components.
- The materials included in the *Teacher Textbook* include units, lessons, and activities for a full year of instruction. For example, the Pacing Plan includes 38 weeks of total instruction, 30 weeks of new instruction, and 8 weeks for revision, assessment, and reteaching. This allows room for adjustment to local time and scheduling constraints.

TPS STEAM into Science Grade 4

Indicator 9.1

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

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

Not Scored

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

Materials do not include an appropriate amount of white space and a design that sometimes supports and sometimes distracts from student learning. Materials do not 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.

- Materials do not include an appropriate amount of white space and a design that supports and does not distract from learning. In the Learn by Doing Steam Activity Reader Book, digital materials are small and only zoom to 300%. Materials are too small to read at 100% on a personal computer and require zooming. When the user clicks on the material, it automatically zooms in to 250% or out to 100%. There is a slider to allow adjustment between 100% and 300%; however, it could be more user-friendly, and some students must zoom in more than the material allows.
- Materials do not include links or guidance to show what is next or when to stop within a chapter or section. Chapters organize the STEAM Learn By Doing Activity Reader Student Edition. However, the chapter name does not always identify the topic, and the topic is not identified elsewhere. For example, Chapter 8 is titled “Zane the Gardener!” and one of the short stories is titled “Alejandro Gets a Dog!” Neither of these prepares students for the science in the text they’re about to read.
- The Student Textbook does not have the appropriate amount of white space to support learning. In the sections where students are reading, the text is too close together, aside from occasional pieces of clipart. For example, in the section Matter and Conservation, the text fills nearly all the page space with only a few lines of white space separating paragraphs. Sometimes the use of white space is inconsistent, such as in The Science section of TEKS 4.6B and 4.6C. The first paragraph has what appears to be two lines of white space separating it from the second paragraph. Then, at the bottom of the page, there is no spacing between paragraphs or headings. On the next page, all of the white space is below the reading with limited white space within the reading.

- The materials do not provide a design that supports student learning. In the Learn By Doing STEAM Activity Reader Book. For example, in Chapter 5, Waste, Recycle & Reuse! some text from the story is larger, bolded, and in a different font type from the rest of the text. This text is usually dialogue, but not all the dialogue is formatted like this, so students need to figure out why this information is bolded. Some of the images provide captions, but sometimes these are in a smaller font like the majority of the text, but other times it is larger, bolded, and in a different font type. The lack of consistency distracts the reader from pulling information from the text.

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

- The pictures do not always support student learning and are often a haphazard mix of clipart and actually photographs. The use of clipart is distracting at various points in the texts. For example, in Chapter 7 of the STEAM Activity Reader Book, there is a cartoonish clipart image of a meteorologist. The expression on the woman's face is incredibly distracting and takes away from the information provided to students.
- The STEM activities in the STEAM Activity Reader Book, Student Edition, include distracting images that do not support student learning. For example, in Chapter 1, Hit that Ball!, two clipart images take most of the space on the page with many things in the class image that distract from student learning. On the following pages, there are clipart images of food and people that do not have a similar look and feel and are more distracting than they are useful to student learning. In Chapter 2, the number of clipart images is overwhelming, and many are pushed right up against the text, making the text very visually distracting.
- In many cases, the pictures and graphics do not support student learning but seem to be added for visual appeal alone or to break up the text. For example, in the Reader Short Story, Recycling Facility Field Trip, There are clipart images of a school bus and other types of vehicles associated with recycling facilities and scrap metal yards. These images do little to support student learning and are visually distracting from the story.

Materials include digital components that are free of technical errors.

- The materials include digital components that are free of technical errors. The STEAM Activity Guide includes activities that are free of inaccurate content materials or information. The materials are also free of wrong answers to questions asked. For example, the STEM activity "Bells and Whistles" includes accurate information about how holiday lights respond to batteries of different voltages, including a warning to not use a single light in a wall outlet.
- The materials are clear of errors in the STEAM Activity Guide. For example, in the Learn by Doing STEAM Activity guide Chapter 1, teacher digital materials are free of spelling, grammar, and punctuation errors. In the Teacher Textbook, Life Cycle, teacher digital materials are free of inaccurate content materials or information.

TPS STEAM into Science Grade 4

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.	No
2	Materials integrate digital technology in ways that support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content.	No
3	Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate.	No
4	Materials integrate digital technology that is compatible with a variety of learning management systems.	No

Not Scored

The materials do not meet the criteria for the indicator. Materials are not intentionally designed to engage and support student learning with the integration of digital technology.

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

Evidence includes but is not limited to:

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

- Materials do not integrate technology and tools that support student learning. Although the materials include online assessments in the Interactive Assessment Tool, materials do not integrate digital technology and tools that support student learning and engagement. The materials do not include opportunities for learning through video and audio clips, web links, photos, games, simulations, or data sets.
- Materials include tasks that require students to access online resources. Materials do not provide specific links or guidance for student tasks. For example, an investigation in the Teacher's Textbook suggests using the Internet and other resources for students to investigate different types of energy in cars. The guidance does not provide suggested websites but does include the following, “If necessary, point out specific sites which will be useful." Materials provide possible answers students might find but do not provide specific websites. All other components are completed on paper, using technology as an optional resource.
- The Learn by Doing STEAM Activity Guide includes embedded tools, such as variable font size, text-to-speech, annotation, and highlighting. However, materials do not include the same features in the student workbook. Materials do not integrate digital technology and tools that support student learning and engagement.

- The STEAM Activity Guide includes a description of Digital Frog activities but without the detail needed to determine engagement. For example, students take a tour of the desert and then explain. The Digital Frog Library is not available for review.

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

- Materials do not integrate digital technology to support student engagement with science and engineering practices, recurring themes and concepts, and grade-level concepts. For example, Chapter 8, Activity 3, asks students to research and provide a report on a food web. However, materials don't offer any digital tools to complete the task.
- Materials do not provide interactive simulations and models for students to explore scientific and engineering practices in a virtual environment. For example, in Learn by Doing Chapter 2, students are asked to draw and create open and closed circuits to test insulators and conductors. Materials do not provide a simulation where students build circuits virtually. Materials do not include interactive resources for instruction, such as videos or interactive labs.
- Materials refer students to outside sources, such as websites, for tasks. For example, in a “Science Makers” task, students use the internet to research information about the Sun. Students take their research to create a fact file that includes drawings and diagrams. Materials do not include further detail to support how the materials can or should be used. The Intervention Focus Tutorial provides opportunities for students to obtain information using digital tools. This digital resource allows students to engage with content that is broken into bite-size chunks rather than in the physical text.

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

- Materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. Although the materials include online assessments in the Interactive Assessment Tool, they do not allow teachers and/or students to collaborate. The assessments are designed to be completed individually after they are printed in paper-based form by the teacher. Materials indicate all online resources are separate links and not interconnected, thus preventing digital collaboration among students and teachers.
- The materials offer sections describing how to use the TPS Digital Frog Library. The broad descriptions sometimes allude to collaborative opportunity. However, many activities provide general direction, such as recommending a class discussion or posing several questions. For example, the STEAM Activity Guide says, "Use Digital Frog and go on the tours of different regions." Then, "Discuss as a class."
- The materials do not recommend platforms, links, or resources on how those digital suggestions can be accessible to students and teachers. Materials do not provide suggestions or resources for collaboration between teachers and students. The Interactive Assessment Tool provides an opportunity for teachers to view student responses digitally but does not allow for collaboration between teacher and student. The Intervention Focus Tutorial can be shared between teacher and student to support student learning. However, this tool does not provide an opportunity for teachers and/or students to collaborate.
- Materials do not integrate digital technology that supports student-to-student collaboration. In the Learn by Doing, Chapter 2, Activity 5, students are asked to review vocabulary words.

Materials could provide interactive games and quizzes students could complete collaboratively in pairs or in teams to study vocabulary, but they do not. Materials don't provide an online collaborative platform in which teachers and students can share educational materials, create collaborative spaces, post assignments, collaborate on projects, and give feedback to students.

- Materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. For example, a Literacy Challenge assignment in Unit 4 of the Teacher Textbook asks students to research and present information on glaciers. Directions state, “Use books and the internet…. You may deliver your presentations individually or collaboratively in a variety of formats.” While materials allow for the integration of digital research, they do not provide specific websites or criteria for presentations, including the use of collaborative digital tools.
- For example, the Teacher Textbook includes an investigation where students could use the internet to research a particular climate to answer a set of questions and possibly present using a computer application. Teacher materials state, “Allow students to choose a climate or assign particular climates to different groups. If you wish to extend this Investigation, students could make a presentation…either as a wall display or as a computer presentation. Materials do not provide specific guidance or criteria for presentations.

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

- Materials do not indicate which operating systems they are compatible with. However, the online materials are accessible via a computer and a mobile device.
- The materials recommend the student use the internet for research-focused activities. The Internet is accessible from many types of devices and learning management platforms. Digital materials are accessible with multiple devices. For example, iPads, PCs, Apple computers, and smartphones can be used to access the materials. However, not all devices provide a user-friendly view to support usage. Teachers and families do not have access to this information within the materials.
- The digital resources for teachers, such as the Online Library - Reader Activity Book Library can be accessed through an internet browser. They are available on any device with internet access, including cell phones. The resource is the same across grades 3 through 5. The materials do not provide any information on compatibility with learning management systems to assign specific text for at-home or in-class use. Materials do not provide examples or information on student and caregiver versions of the digital resources. The digital resources for teachers, such as the Online Library - Alaska resources, are web-based and can be accessed through an internet browser. The resource includes printed materials and music samples. The materials do not provide any information on compatibility with learning management systems to assign specific content for at-home or in-class use. Materials do not provide examples or information on student versions of the digital resources.

TPS STEAM into Science Grade 4

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.	No
2	Materials provide teacher guidance for the use of embedded technology to support and enhance student learning.	No
3	Materials are available to parents and caregivers to support student engagement with digital technology and online components.	No

Not Scored

Materials do not meet the criteria for this indicator. Digital technology and online components are not developmentally and grade-level appropriate and do not provide learning support.

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

- No, digital technology and online components are not developmentally appropriate for the grade level and align with the scope and approach to science knowledge and skills progression. The materials include references to digital activities but do not include the activities. The missing resources cannot be evaluated for appropriateness, alignment, or approach. Materials do not provide a rationale for the age-appropriateness of digital components in the Assessment Guide. For example, a “Science Makers” task on seasons lists the internet as the tool to use for data collection but does not provide samples of websites that are appropriate for 4th graders to collect the information needed.
- Materials don't describe the amount of time students assess digital materials via screens by grade level. For example, the Learn by Doing STEAM Activity Guide states, "Please refer to your school's computer safety policy for work that involves students using computers and the Internet," with no mention of time frames. Materials in the Learn by Doing STEAM Activity Guide do not include a digital planning guide with live hyperlinks to the other online resources to facilitate planning and ease of use. For example, the materials state, "The chapters may be read in any order to align with individualized curriculum pacing. However, to help with planning, an Essential Content Guide can be found...This section highlights key STEAM content within each chapter and its associated activities section." Materials do not include hyperlinks to the online resources.

- Materials provide limited guidance on grade-level appropriate use of the Internet as a research tool. For example, the Teacher Textbook integrated the use of the Internet for students to investigate the principles behind alternative energy resources. The materials provide guidance to teachers for integrating technology into station investigations, stating, “If access to computers and the internet are available, it is best to pre-select grade level appropriate websites ahead of time.” Technology integration is aligned to grade level TEKS, 4.11B; explain the critical role of energy resources in modern life. The materials utilize the Internet for research, which may be developmentally and grade-level appropriate with proper teacher supervision. The Teacher Textbook provides an investigation where students use the internet and print sources to identify mineral samples. The materials do not provide teacher guidance on proper and safe internet use for research or provide specific websites for students to reference.

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

- Materials do not provide teacher guidance for the use of technology to support or enhance student learning. The Teacher Program Guide describes each of the resources within the TPS suite. One section, Support Notes for Teachers, details each component and how to use them. However, the notes do not offer information to assist teachers with the implementation of digital resources. The Assessment Guide includes some tasks requiring students to use the internet to complete the activity. For example, a "Science Makers" task lists the internet as the tool needed to collect data about the amount of daylight in different locations but does not include specific teacher guidance for embedding technology within the task. Materials provide some teacher guidance for using technology to support and assess student learning. Materials include a video to walk teachers through using the Interactive Assessment Tool. The information included in this video does not detail how this tool enhances student learning.
- The Learn by Doing implementation guide does not include step-by-step instructions for setting up and using the technology, as well as troubleshooting tips for common problems that teachers may encounter. Instead, the guide includes implementation instructions for reading guidance, comprehension skills, composition, developing a research plan, vocabulary, scientific method, classroom safety, and the design engineering process. Materials don't provide specific teacher guidance for embedding the technology within lessons and assessments. Materials provide an Essential Content Guide, showcasing which chapter may have technology integration. However, it doesn't recommend to teachers which days to use technology with students or a time within a chapter to use technology to enhance a lesson.
- The Teacher Textbook includes a Literacy Challenge in Unit 2. The materials state, “Use online platforms to conduct a short research project to help you enhance your understanding of the topic being studied. Your teacher will provide you with links to various online platforms.” The lesson plan does not provide specific links and only provides the following guidance on student responses, “Student answers will vary.” The materials do not provide specific websites, relying on the teacher to find alternate resources.
- In a Literacy Challenge in Unit 4, students research tides on the nearest coastline and present their information in a short piece of writing. The materials state, “Tide timetables can be found online, which will show you the times of high and low tide every day for a period of time. Look at the times over the period of a month. Do you notice any patterns?” The lesson plan does not provide specific links or guidance on possible student responses.

- Materials don't provide clear instructions and tutorials within the teacher platform on how to use the embedded technology in the Learn by Doing STEAM Activity Guide. There is no embedded technology. Materials state, "Please refer to your school's computer safety policy for work that involves students using computers and the Internet."
- Materials provide a video for teacher guidance on the interactive software tool and the assessment generator. Materials do not provide additional videos for resources such as the intervention focus tutorial. Materials do not include step-by-step instructions for setting up and using technology. Materials do not provide troubleshooting tips for common problems teachers may encounter.

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

- Materials do not provide parent and caregiver resources for supporting student engagement with digital and online components. Materials state, "TPS Publishing Inc. provides parent digital access to family to families for all homework assignments, and to the list of keywords and definitions." Materials state that the Family/Caregiver Guide provides guidance for parents and caregivers about how to use digital materials. However, the Navigation Guide is designed for teachers, not families. The Navigation Guide shows how teachers can access the textbooks, Assessment Database, Interactive Assessment Tool, and Intervention Focus Tutorial. The guide does not include how to support student engagement with digital technology.
- The resources do not provide specific guidance for parents or family members to access resources. The materials only offer a short description of Digital Frog and Alaska Library, the two digital components of the TPS program. The Family/Caregiver Guide states that caregivers are provided with access to “homework materials (digital access);” however, resources for how this information can be used to support student engagement are not provided. The Family/Caregiver Guide includes a “Navigation Guide” for online resources. The materials include a labeled image to assist in navigating the layout of the online textbooks to support student interactions with the different components. The materials do not include suggestions on how this resource can be used at home to support student engagement.
- Materials provide a letter with tips for families on how to support appropriate student engagement with digital and online components. For example, materials provide the Family/Caregiver Guide explaining the process of State adoption, TEKS, and the research behind program content. The guide states materials "provides parents with digital access to families for all homework assignments." Materials do not include information on how to access the resources. Materials provide an e-letter that provides online access to materials, resources, and activities to reinforce student learning and development. Materials state, "Teachers are to provide digital access to caregivers at the start of each term," but it doesn't elaborate on how teachers are to give out that information.