TPS STEAM into Science Grade 5

TPS STEAM into Science Grade 5 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.

- The Program Guide describes some of the vertical and horizontal alignment of the program. It references the use of storybooks “to provide an introduction to in a personally relevant manner.” The STEAM Storybook is followed by the activities section. Materials state, “These activities build upon communication, creativity, critical thinking, and collaboration.” Materials also include a flowchart to show horizontal alignment. The description in the Program Guide fails to show the progression of concrete then representational, and, finally, abstract reasoning throughout the program. Materials do not include a progression of concrete and then representational before abstract reasoning when presenting concepts. The *Learn By Doing STEAM* Activity Guide chapter “The Mystery Matter Game” begins with a whole group reading of a chapter. Through the reading, “idea boxes” occur where teachers lead discussion prompts. The first idea box prompts the teacher to discuss the difference between weight and mass. The second idea box prompts teachers to show a website that explains alloys and shows “that all metals are not attracted to magnets.” The third idea box has teachers guide students as they identify materials according to their state of matter. This progression of learning begins with the most abstract concept and ends with the most concrete.
- Materials introduce content through the text in the *Learning By Doing* Student Reader. 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, *Learning By Doing* text, begins with a setting description and the teacher character asking students to describe what is occurring. For example, a chapter on Rocks and Fossils describes students calculating the number of rocks brought from a field trip to launch the content. The story then transitions to science content with the fictional teacher, Mr. Song, asking, "What were the three processes that change a landform's structure?" and a student responding with a definition.

- Materials do not clearly connect some new learning to previous and future learning within and across grade levels. In the *STEAM Activity Guide* Teacher Edition, the lesson overview from “Laser Razzle Dazzle” states, “This lesson centers on lasers. It will be very popular with your students. Lasers are fun. They can be used for some interesting applications. This lesson specifically addresses how laser beams can be reflected and used to activate a switch…” The lesson does not outline a specific learning goal. Materials do not reference or guide previous learning, either within the grade level or across grade levels, within the teacher guide of this lesson cycle.
- 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 Assessment Guide list unit objectives before each unit and on each following page for that unit. For example, the Science Makers Matter and Energy Unit student objective is, “The student knows that matter has measurable physical properties that determine how matter is identified, classified, changed, and used." This current section's objective is for students to "demonstrate and explain that some mixtures maintain physical properties of their substances, such as iron filings and sand or sand and water."
- 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 Integration Table for the *Learn By Doing STEAM* Activity Reader does provide citations for lessons that include specific TEKS and shows the TEKS across grade levels. However, it does not reference specific learning or activities, and educators would need to look through past or future grade-level materials to determine how concepts were taught. The program relies on TEKS to fulfill vertical alignment, which does not give the full scope of how the program introduces and presents standards in its unique way.

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

- 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.
- In a lesson on position and movement, materials ask students to remind students of what they previously learned on the topic. Teachers then ask students to define position and movement. This activates prior knowledge and builds up the content for the topic of balanced and unbalanced forces. Materials activate prior learning from grades 3 and 4 by having students engage in the reading of a short story related to the topic. Students read a short story on an ecosystem and discuss the different parts of that ecosystem. This sets the stage for an explanation of the levels within an ecosystem and food webs/chains.

- Materials include a progression that frequently places representational before concrete learning when presenting concepts for student learning. For example, in a grade 5 lesson on properties, students first read about the different properties objects can have and respond to questions about the text (representational), then provide an investigation for students to explore the physical properties of objects (concrete), and finally share what they have learned about measuring, testing, or observing physical properties (abstract reasoning). Materials include a progression that places representational learning before concrete learning when presenting concepts for student learning. For example, in Chapter 7, "Traveling Light," in the *Learn By Doing STEAM* Activity Reader Book Grade 5 Teacher Edition, instruction begins with an expository text about the behavior of light before moving into activities investigating the behavior of light, such as transmission through materials.

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

- Materials include a section on fossilization in the *Learning by Doing* Teacher Edition. This is not content addressed in grade 5 but could be reviewed from G4. The grade 4 expectation is for students to use fossil evidence to describe past evidence. Materials include content from Biology TEKS, such as the geological timescale and the fossil record. The *Learning By Doing* text describes the coins as alloys. The TEKS introduces metalloids in grade 6. Grade 5 students classify by solubility and demonstrate mixtures maintain properties of combined substances.
- Materials do not consistently provide instruction on 5th-grade core concepts. For example, some of the expository text and student activities presented to students in Chapter 3, "Sun, Earth, and Oceans," address concepts that have been removed from the TEKS for grade 5. In Activity 1, students research a location using latitude and longitude and explore the location's climate. Students respond to questions differentiating weather and climate, which is included in the 4th grade TEKS. In Activity 2, students compare the Earth with the Sun and the Moon, including the specific physical characteristics of each. This concept is found in 3rd, 4th, and 7th-grade instruction. Activities found later in the chapter, specifically Activities 7, 8, 9, and 10, do address Grade 5 core concepts. These include demonstrating how day and night occur on Earth, an understanding of the water cycle and the formation of landforms, and designing and explaining conservation solutions for natural resources.
- Materials accurately present grade-level core concepts and science and engineering practices in some lessons. For example, a grade 5 lesson investigating how forces cause patterns of motion includes expository text that chunks the learning for students to address the force of magnetism, followed by a descriptive investigation of how that force causes patterns of motion in an object. Conducting descriptive investigations on forces, including magnetism, is specifically addressed in the TEKS for grades 3-4, while grade 5 targets experimental investigations.
- Materials provide some hands-on practice through investigations and project-based learning. Materials provide the science and engineering practices lessons at the end of the Teacher Textbook. Materials utilize a routine of the following: 1. Define and delimit engineering problems, 2. Influence of Science, 3. Generate and compare, 4. Develop possible solutions, 5. Plan and conduct an investigation, and finally, 6. Test your findings. Materials provide concrete mathematical applications along with each lesson through Math Challenges or Math Extensions. For example, the Capsized Conundrum lesson has a math extension where students convert the measurements of units.

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

- 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 states the lesson goals. The same lesson also includes an assessment opportunity. However, the content does not describe boundaries or content limitations. An earth science lesson displays an objective at the beginning and ends with a discussion about changes to the land. There are no other lesson parameters or boundaries.
- Materials do not clearly define the boundaries of content that students must master for grade 5. For example, in the grade 5 chapter “Energy Everywhere,” students are provided with text introducing parts of an atom and pitch, frequency, and decibels in relation to sound energy. Terms like these should not be formally taught or assessed in grade 5. At this age, students are assessed for investigating energy transformations in systems, including circuits.

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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 identify common grade-level misconceptions students may have about the science concepts within the “Common Misconceptions” section of the traditional lessons found in the Teacher Textbook. For example, in the grade 5 lesson “Boiling, Freezing, and Melting,” materials identify common misconceptions students may have about the appearance of water vapor as the white cloud seen coming from boiling water and how thermometers work. Materials identify some grade-level misconceptions that are barriers to student conceptual development. For example, the STEAM Activity Guide Teacher Edition lesson “Laser Razzle Dazzle” includes information for teachers about the misconceptions students may have about lasers and how they are seen and used based on how they are often portrayed in TV shows and movies. The "Background and Misconceptions" section in the Teacher Textbook provides teachers with information to support the development of their content knowledge. For example, the materials provide a section for teachers to understand patterns of motion with balanced and unbalanced forces. Materials provide background to establish the benefit of using catapults to investigate force, speed, and distance. In the Teacher Textbook. Materials state, "A catapult causes an object to move because it transfers kinetic energy to the object (from stored elastic energy).
- 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 called Adaptation, the Teacher Tip states, "Ask students to name different structures and functions of animals and plants that help them live and survive in their environments." Materials provide Scaffolding Information before each lesson. This information can assist new teachers in knowing what students should already know from previous grade levels and what they are projected to learn in future grade levels. Materials Provide additional resources to support the teacher's deeper content knowledge, such as online resources, current research articles, or podcasts. For 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.

- Materials provide 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 the scientific method, including information about grade-level specific writing requirements. This background information is referenced in an activity on decomposition later in the guide. Materials provided background information for teachers that provide explanations and examples of science concepts. For example, the Teacher Textbook provides teachers with information about living things in an ecosystem. The lesson plan provides a "Background and Misconception" section that informs teachers about food chains, including primary and secondary producers and consumers. The content vocabulary is bolded, and the section provides an example of how drought can affect a food chain.

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

- The Program Guide "Philosophy of Science" teaching 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."
- 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 explains 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."
- Materials provide a purpose or rationale for the instructional design of the STEM projects or project-based lessons. For example, these lessons follow specified criteria called the DAPIC that students should follow during investigations while teachers act as facilitators. The DAPIC process is to define, assess, plan, implement, and communicate. The Teacher Program Guide materials explain the purpose of the STEAM Activity Guide. The STEAM Activity guide maintains a format that is easy for teachers to follow, with varying components and strategies teachers can use to ensure students master content and deepen understanding.

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Indicator 4.1

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

1	Materials consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers.	M
2	Materials provide multiple opportunities for students to engage with 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.

- Materials provide guidance on student behaviors during discussions following textbook work and investigations that could be tied to sensemaking. For example, in the Teacher Textbook's traditional lesson plan for "Scientific and Engineering Practices," teachers are given guidance on student behaviors during reading and discussions of scientific text; "Throughout this lesson, encourage students to use support from their peers, teachers, friends, and guardians to read grade-appropriate text, enhancing and confirming their understanding, developing vocabulary needed to understand increasingly challenging language, grasping the meaning of language structures, and developing background knowledge." For example, in the Teacher Textbook's traditional lesson plan for "Modeling Systems: Scale, Proportion, and Quantity," materials include teacher guidance on student behaviors when creating models of systems. The lesson plan highlights the importance of scale, proportion, and quantity. Students evaluate a diagram

of the solar system. Students complete a textbook reading with the teacher and then create their diagram of the solar system, implementing proper scale, proportion, and quantity.

- Materials provide a story about ecosystems to support sensemaking around concepts in life science. The teacher in the narrative describes biotic and abiotic factors and flow energy. The text provides callouts for students to direct attention to aspects like populations and habitats. Diagrams also represent concepts visually. Students create food webs and present the flow of energy. Students apply critical thinking skills to predict how changes could impact the ecosystem. Later, students read about ecosystems in the *Learn By Doing STEAM* Activity Reader Book Chapter 1, "Ecosystem in My Backyard!" and students continue an investigation on decomposition using the scientific method.
- Students learn about sedimentary rock formation and fossils by reading the Learning by Doing STEAM Reader. Materials do not only include the *Learn By Doing* Activity Reader Book. This is component 1 and provides conceptual understanding and a gentle introduction to the topic. TEA confirmed that having extensions and additional content for below through advanced learners was not an issue, provided that content covering each TEKS does appear in the program. The teacher textbook has detailed content for TEKS 10B from pages 459-475; The STEAM Activity Guide TE has multiple STEAM lesson plans from pages from 260-312. TPS believes that the *Learn By Doing* content plus the content delivered in these lesson plans does meet this section. The requirement is met as TPS consistently ensures for all TEKS that sensemaking occurs within the program, not necessarily in each component in every lesson plan. Having said this, please review the author's comments for LBD content

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 5, in Chapter 6, Energy Everywhere, the text discusses forms of energy but introduces, explains, and actively uses the terms kinetic and potential energy, as well as chemical and radiant energy. For example, the text states, "Potential energy is stored energy before it is used for work. When energy is then used, it is called kinetic energy, the energy of motion that carries out work." 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 to engage with grade-level appropriate scientific texts. However, in the Learn By Doing STEAM Activity Read for grade 5, in Chapter 6, Energy Everywhere, the materials explain the structure of an atom, including the terms nucleus, proton, electron, and neutron. This student text also discusses atoms of elements and their makeup by stating, "all elements are made up of the same type of atom, for example, oxygen, and each atom has equal numbers of electrons and protons, so they are neutral." The text also discusses the charges of each part of the atom and their respective charges or lack thereof. This is not grade-level appropriate text as atoms, and their structures are not discussed until middle school, starting in grade 6 with TEKS 6.6A.
- The materials provide some opportunities to engage with grade-level appropriate scientific texts. However, in the Learn By Doing STEAM Activity Read for grade 5, Reader Short Story - Sound and Music! the materials provide text and diagrams outlining waves, wavelengths, and areas of compression and rarefaction, including "The vibration causes pressure waves in the air, beginning with squeezing or compression, and releasing or rarefaction. One sound wave is one

complete pressure wave." The scientific information here, while accurate, is not grade-level appropriate for grade 5 as it was first introduced in TEKS 6.8C in grade 6.

- The materials provide some opportunities for students to engage with grade-level appropriate scientific texts. In the student investigation provided in the student edition of the textbook, How can you prevent an ice cube from melting? students try to design a casing that will attempt to keep their ice cube from melting. In the questions following this activity, students are asked, "The package is designed to prevent heat transfer. Which part of your packages was designed to prevent the following forms of heat transfer?" and it gives three areas for students to respond with the labels Conduction, Convection, and Radiation. This is not grade-level appropriate text, as these topics are not introduced in the TEKS until grade 7 with TEKS 7.8A. When content that is not grade-level appropriate is provided in scientific texts, it increases the difficulty students have with gathering evidence and developing 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.

- Students have multiple opportunities to write about and chart evidence to communicate scientific concepts. In the chapter "The Sun, Moon, and Oceans," students research a location's climate using latitude and longitude. Students use internet maps and guiding questions to compare day-to-day weather and long-term climate in a chosen city. Students then develop presentations to share their research and thinking with peers. Materials provide activities for students to share their thinking through discussion, writing, creating visuals, and sharing data via graphs and charts. One activity, "Concave and Convex Lenses," asks students to investigate how light will interact with materials and communicate their findings with a written explanation. Students support their thoughts using annotated drawings to show the path of light.
- In a "Think and Craft" activity from the STEAM Activity Guide, students create a food web and label the Sun, producers, consumers, and decomposers.
- During a "Word Wall Read Aloud Activity" on energy, students create labeled sketches of the interior and exterior of their device and the circuit to be used. Students continue to evaluate their design process as they create a table with the headings "What Went Well" and "What Could Have Been Done Better."
- Materials provide opportunities for students to communicate thinking on scientific concepts in written and graphic modes. For example, in Chapter 1 of the *Learn by Doing STEAM* Activity Reader, Activity 4, students write a response after reading a short story describing a healthy ecosystem. Students predict the effects of changes in the ecosystem caused by humans (beneficial and harmful).

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

- Materials provide authentic student engagement and perseverance of concepts through productive struggle while acting as engineers. For example, Activity 10, "Design Challenge – Conservation," in Chapter 3 of the *Learn By Doing STEAM* Activity Reader Book has students design and explain conservation solutions. Students follow the engineering design process to design a solution, test it, and make improvements as necessary.

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- In the grade 5 STEM Project “Pick Your Favorite,” students design and construct a habitat containing multiple different environments. Students include different species of organisms inside, seal them, and observe the environmental preferences of each species.
- In the STEAM Activity Guide, students complete observations and experiments using balloons to model and represent the force or pressure exerted on everything on Earth by the air around the Earth.
- Materials create transfer opportunities for students to take what they have learned and use it flexibly in new situations. For example, in Chapter 2 of the *Learn by Doing STEAM* Activity Reader, Activity 5, students create an imaginary animal with adaptations for survival (physical and/or behavioral) on an imaginary island. Students name, draw, and label this animal, and then write a paragraph describing this animal and its adaptations.
- In the Student Textbook activity: Objects Moving Quickly, students create catapults to answer the question, “What are some different ways in which an object can be made to move more quickly?” Students research or create their own investigation. The activity references questions asked in previous investigations on movements, showing transfer opportunities.

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Indicator 5.1

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

1	Materials prompt students to use evidence to support their hypotheses and claims.	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 offer some prompts to use evidence to support claims and hypotheses. The Learn by Doing STEAM Activity Guide extends a design challenge to students to address conservation. The materials asked students to use a system to evaluate a problem and then design and test the solution. Students describe how they improve upon their plan and "where possible, they should quantify their results." The materials extend some opportunities to assist students with using evidence to support their claims. However, many activities rely on gathering and citing text evidence to respond to questions. One example in the earth science unit asks students to "use text evidence to support their responses." The students collect information through several investigations in addition to developing conclusions. The materials fall short of helping students use their evidence to justify their claims and address the hypotheses.
- The materials do not prompt students to use evidence when supporting their hypotheses and claims. For example, the activity "Force" from Chapter 8 of the Learn By Doing prompts students to "record whether their hypothesis was correct and what they learned from this experiment." This prompt lends itself to a wide range of responses, which may not include evidential support for the hypothesis made.

- The materials provide some opportunities for students to develop how to use evidence to support their hypotheses and claims in some ways. The material's primary opportunity for students to develop how to use evidence to support their hypotheses and claims is through the scientific method. For example, in the Learn By Doing STEAM Activity Reader Teacher Edition, Chapter 1, Activity 2, students are provided with an opportunity to develop how to use evidence to support their hypothesis. The materials provide some opportunities for students to develop how to use evidence to support their hypotheses and claims in limited ways. One of the materials' primary opportunities for students to develop how to use evidence to support their hypotheses and claims is through Project Based Lessons in the Teacher Textbook, but not all Project Based Lessons include hypotheses or claims. For example, in Unit 2, students are asked to design an investigation where they “will fill different balloons with different scents to see if your partner can determine the smell.” The lesson has students create 4 scent balloons and then test if their partner can identify the smell located in each one. Students record their responses and then answer a set of questions at the end of the investigation. The questions include, “Did some of the balloons smell more strongly than others? Explain. How did the smell get from inside the balloon to outside the balloon, Explain.

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 along with its definition. In the lesson Properties in the student textbook, materials provide a keyword chart with vocabulary words and their definitions but no visuals.
- The materials support scientific vocabulary primarily through text and reflection questions. Additional activities, such as activity, creating a map describing energy usage as a group, may follow, though not consistently. The following Science/ELA Word Wall Activity directs students to "Research a top 10 list of uses of their energy type of humans. Cite references." using vocabulary terms. The materials also ask students to summarize the energy transformation by using the keywords. The STEAM Activity Guide provides concrete experiences through Explore It to support students in developing and using scientific vocabulary. This support occurs after the terminology has been explicitly taught through text and serves as an extension, not the initial instruction.
- The materials present scientific vocabulary using multiple representations. For example, each chapter in the Learn By Doing text includes an activity for vocabulary words and terms. This activity refers teachers to use the TPS vocabulary cards and the “Reading Guidance & Vocabulary sections in the Introduction for other information on the decoding of words with the students and methods in which to use the words to demonstrate spelling knowledge, phonetics, and print awareness.” The materials present vocabulary using multiple representations. For example, the lesson on energy in the 5th-grade Teacher Textbook includes a “Keywords” section after the student reading that provides definitions for bolded words using student-friendly language. Many of the words were also found in the Science Picture Glossary for 5th grade. This resource includes images and linguistic support to support students as they practice reading and writing science vocabulary.

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

- The materials provide some opportunities for students to conduct investigations and describe the results. The materials ask students to describe the interactions in the system in a physical science chapter. The Teacher Textbook asks students to scale up the plan and reference the circuits created in the house. The practice can extend to developing arguments to justify engineering solutions. However, the materials do not directly make this connection. The Learn by Doing STEAM Activity Guide - Teacher Edition introduces aspects of the argumentation to the teachers for student support. For example, a section on weather asks students to gather weather data from different global locations. The materials also recommend teachers "work with (students) to create a short report summarizing their weather analysis in their notebook. The information should have an introduction describing what they were going to measure and a section describing the methods they used to monitor the weather.
- The materials integrate some discourse within stages of the learning cycle but do not integrate intentional argumentation into the learning cycle. In Chapter 7 of the Learn By Doing STEAM Activity Guide Teacher Edition, Activity 3, students use the scientific method "to investigate the transmission of light through different materials." Students "generate a hypothesis based on their observations on how the light will behave with the different materials with an explanation" during the hypothesis portion. After conducting the investigation, "students describe their results." The materials provide teachers with guiding questions to ask that include, "Was there a difference in the results in class? What may have caused this?" Finally, students "record whether their hypothesis was correct and what they learned from this experiment." While the activity provides opportunities for an argument to be integrated, it is not clearly identified or described. The lesson focuses on the discussion. The guidance prompts the teacher to analyze the materials and describe how they might be used with students but does not include prompts or questions for students to form, support, or discuss arguments based on evidence from the investigation.
- The materials integrate some argumentation and discourse within stages of the learning cycle. For example, in the STEAM Activity Guide Word Wall Read Aloud Activity in the unit Organisms and Environments, students "hold a class debate. Each speaker must use all the following words. One speaker must represent a logging company and another a protection organization for chameleons. Vote at the end to obtain class opinion/decisions as to whether logging must cease with immediate effect." Words to include are "adapt, camouflage, diet, environment, predator, and prey." While the activity provides an opportunity for argument, it does not provide any guidance or structure on how students develop arguments using evidence. The activity also does not provide any guidance on how all students can participate. The materials describe two students participating and the rest voting. The materials do not provide any explanation of how the required words should connect to the debate or guidance on how to help students construct their arguments.

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

- The materials provide some 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 5th-grade design challenge "Conservation" in the Learn By

Doing text, students are prompted to create a poster. The criteria provided include describing the problem, the student's solution, and the solution's contributions to conservation. Students are also prompted to quantify their results "where possible." The materials provide some 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 5th-grade investigation "Animal Families" in the Teacher Textbook, the only criteria provided to teachers is that "Answers will vary" to questions posed to help explain how animals meet their needs differently.

- 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 will design an animal and explain how its physical features will help their animal survive." The "Additional Hints" section includes further guidance. "As students are designing their animal, they will have to justify why they chose to give their animal and each of its features." The student materials do not use the word justify in directions or questions. Examples include, "You will use your imagination but will have to explain why you designed it the way you did," and "What external features did it have that allowed it to survive in the environment?" While the student materials provide an opportunity to add justification, the materials do not provide direct prompting of justification.
- The materials do not provide opportunities for students to justify explanations of phenomena and solutions to problems using written and verbal arguments problems using evidence acquired from learning experiences. For example, the Learn By Doing STEAM Activity Reader includes a Reading Comprehension activity for each chapter. The activity directions state, "They should use text evidence to support their responses." This does not allow students to justify explanations of phenomena and solutions to problems as the questions are directly related to the narrative text and not phenomena or engineering problems. The questions include, "Who ran the Music Club? What instruments did the students play? Who was Lee Ann Kim? What role did she have at the recording studio? What is pitch? What is measured in decibels?" The activity does not ask students to make any claims about sound energy that would require justification from the text, whole group discussion, or other included activities
- The materials provide some opportunities for students to communicate through written explanations in the Learning by Doing Activity Guide. The student edition lists several questions, such as " What caused the power to go out?" and "How did people manage before electricity?" in the Reading Comprehension section. The teacher edition prompts teachers to ask students to use "text evidence to support their responses." The Reading Comprehension activities contained vast results for the electronic search of the word "evidence" in the Learn by Doing STEAM Activity Guide - Teacher Edition. The student edition did not specifically recommend students justify using evidence or data.

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Indicator 5.2

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

1	Materials provide teacher guidance on anticipating student responses and the use of questioning to deepen student thinking.	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, including how to build on students' thinking. 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 materials provide some teacher responses to possible students' responses, including how to build on students' thinking. For example, "Idea Box 1" from Chapter 1 of the Learn By Doing STEAM Activity Reader Book introduces students to the vocabulary word population. Materials provide questions the teacher can ask to help build students' thinking. Materials state that "counting the number of students in your school can be done with accuracy. However, counting wolves and lions is an approximation of the population carried out by scientists."
- The materials provide some teacher responses to possible students' responses, including how to build on students' thinking. For example, the 5th-grade lesson "How are all living things

connected in an ecosystem?" found in the Teacher Textbook includes "Teacher Guided Questions to Inquiry," which can be used during the lesson to build on students' thinking.

- Materials provide teachers with some student responses to questions and tasks. For example, the Physical Properties lesson in the Teacher's Textbook provides possible answers students will find while conducting the experiment, testing conductors and insulators. Materials in the Learn by Doing STEAM Activity guide do not provide support for teachers, such as possible student responses to questions and tasks. For example, in Chapter 8, Force and Work, none of the activities 1- 6 have possible student answers present.
- The STEAM Activity Guide provides a Word Wall Read Aloud lesson. The teacher read a short story about states of matter. Students answer a set of questions after that, including reading comprehension and science content knowledge. The Teacher Edition provides answers and some example answers but does not provide any specific teacher responses or tips for student responses that may differ from the example.
- In the research student activity, students answer, “How can the inflation of a toddler’s armband be evidence that there are particles of matter too small to be seen? How are air and weight related?” The Teacher edition provides general guidance, stating, “Answers will vary. Check for accuracy.” The materials provide an example answer but do not provide specific teacher responses to possible student responses that may differ from the example.

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

- The materials provide some guidance for students to develop scientific vocabulary in context. In the Learn By Doing STEAM Activity Reader, the materials offer the vocabulary terms used throughout the chapter. The materials state," Refer to the Reading Guidance & Vocabulary sections in the Introduction for other information on the decoding of words with students..." The referenced section provides general recommendations and does not apply to the current content. The teachers do not have additional guidance within the chapter on speed to support teachers. The Key Words section of the Teacher Textbooks lists science vocabulary incorporated throughout the chapter. The materials follow text and investigative activities to develop the vocabulary in context. For example, the grade 5 resources list the terms "energy" and "insulator" after reading and investigating the transfer of energy in a system.
- The materials provide some embedded supports for the teacher in how to introduce and scaffold students’ development of scientific vocabulary. For example, the STEAM Activity Guide includes an Amelia Rose Explores lesson in the Earth and Space Unit. The lesson includes a 2-page list of scientific vocabulary words with definitions. The materials include an optional activity for in-class or homework. Students “create a piece of writing which uses all the words from this vocabulary list….The piece of writing should be based on this lesson; students should be able to tell a story or recall facts learned.” The lesson does not provide scaffolds for students to develop their vocabulary knowledge. The list includes 30 words related to Earth and space. The Teacher Edition provides no support for teachers to use with scaffolding or supporting students’ development and use of scientific vocabulary as they complete this activity.
- The materials provide some guidance for the teacher on how to support students' use of scientific vocabulary in context. For example, after the keywords in the 5th grade Project Based Lesson on energy, teachers' students use scientific vocabulary “meaningfully during both speaking and writing activities.” The materials mention using activities such as working in pairs to read and “building the ability to utilize new basic and academic language confidently.” Materials do not include any guidance on how to support such activities.

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

- The materials provide some teacher support to prepare for student discourse. In the 5th grade Learn By Doing STEAM Activity Reader Book, an example is given 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. Materials do not include support for establishing this classroom culture. The materials provide some teacher support to prepare for student discourse. Lessons in the 5th-grade Teacher Textbook include opportunities for student discourse. Materials do not provide support for teachers in preparing students to engage in discourse beyond the early lessons in the school year. For example, in the investigation “Name That Tool,” teachers are provided a list of things to look for during the discussion. This focuses more on vocabulary acquisition and is not evident in establishing a classroom culture for student discourse.
- 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 “predict what will happen when coins are placed in lemon juice.” After conducting the observation, students “check whether their prediction was correct and then try to provide a scientific explanation of what has occurred, either orally or in writing. The Guide provides a 3-point rubric, but the guidance is limited for teachers to provide meaningful feedback. To score 3 points, students must “predict that coins will become shiny and clean because of removal of the outer layer of dirt. They are able to identify that the copper has reacted with oxygen in the air, making the copper oxide coating….” The rubric, for a score of 2 points, states, “Students correctly predict that coins will be clean and shiny. The acid has reacted with the surface dirt to clean it off.” There is no feedback provided for teachers to support students moving from a 2 point to a 3 point, including possible probing questions or what actions a teacher should take if students do not score a 3.
- The materials provide some guidance, for example, an activity investigating circuits in the Learn by Doing STEAM Activity Reader containing teacher supports for student discourse. After students create a circuit, the materials encourage discussion identifying components of the circuit and its shape. Several questions, including" Why do factors impact how the system functions?" guide teachers throughout the conversation with students.
- The materials provide some guidance during scientific investigations that teachers can use to provide feedback to students while engaging in discourse. For example, the Learn By Doing STEAM Activity Reader includes a scientific investigation in Chapter 7. The investigation includes an Analysis and Discussion portion. The teacher materials provide some guiding questions, such as, “Were their predictions correct? Was there a difference in the results in class?” The materials do not provide any feedback guidance to use during the discussion. The teacher materials do not provide possible outcomes of the investigation or feedback relating to such outcomes. The Introduction includes general guidance on scientific investigations used in the Learn By Doing STEAM Activity Reader. Teacher guidance does not include supports for specific science content each investigation would explore. Materials only provide feedback support focused on the implementation of the Scientific Method.

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

- 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 Teacher Textbook contains a Project-Based Lesson in Unit 5. Students explore animal behavior and inherited traits through various activities. The activities provide limited guidance for facilitating the sharing of students' findings. For example, the "Sounds Like" activity provides the teacher with a 5-step activity guide that includes the following, "Give each group a baby animal to investigate. Each group fills out their animal on the chart. Share the information with the class." While the materials provide an opportunity for students to share their findings, they do not provide teacher supports to facilitate discussions, such as feedback tips and examples. The activity plan does not provide any guidelines for teachers to measure success criteria during discussions.
- The materials provide some support and guidance to engage students' thinking during class discussions. For example, Activity 3, "Simple Circuits," from Chapter 6 of the Learn By Doing STEAM Activity Reader Book, includes questions for the teacher to use during a class discussion after the activity. Materials do not provide exemplars of students' responses. Materials include some guidance to engage students' thinking in a verbal form. Materials provide the question "What Factors could impact how the system functions?" and then prompt teachers to "ask [students] to use 'cause and effect,' to describe how this would impact the system."
- The materials offer some opportunities to observe and record mixtures in grade 5. The activity offers teachers several questions to guide the discussion and facilitate students sharing their thinking, such as possible uses of the materials, the physical properties that lead to the use, and the application of "cause and effect discuss polystyrene as an insulator." The Learning by Doing Activity Reader Book allows students to investigate, analyze, and discuss their results. Some activities more fully encourage student discourse or offer teacher guidance. For example, in Activity 4, Concave and Convex lenses, ask the students to investigate light refraction. The activity includes a section called "Analysis and Discussion of Results." The materials ask students to create a tree map and compare the two lenses. The teachers have a list of suggested comparisons but no support for student discourse. Instead, the materials state, "Ask the students to record if their hypotheses were correct and why. What did they learn?"

TPS STEAM into Science Grade 5

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 5 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. However, the items indicate only one standard. Some of the content included in the item was not marked. For example, the materials offer the question, "What question might you ask to find out how soil is formed?" aligned to 1A. The item does not include content standards. 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. For example, the “What Have You Learned?” section of a 3rd-grade lesson on properties includes “6(A) measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float in water” is provided at the top of the page.
- 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 5.

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 expectation 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.

- Most assessments in the grade 5 materials do not require students to apply knowledge and skills to novel contexts. Materials include some assessments that require students to apply knowledge and skills to new problems. The Assessment Guide includes “Science Makers” tasks for grade 5 students to apply their understanding in a new context. For example, the “A changed habitat” task prompts students to select a habitat and create “before” and “after” images to show how the habitat changes after a selected environmental change. The STEAM Activity Guide provides opportunities for students to apply knowledge and skills to new phenomena. After reading about equal and unequal forces in the story “Game, Set, Match,” students create a game of tug of war to further investigate this concept. The open-ended questions within the Assessment Generator allow students to apply content in novel forms. However, without additional prompting, students could recall activities from class to develop their responses. For example, a grade 5 question asks students, "What are some properties that can be used to identify a substance.
- For example, in Learn by Doing Chapter 7, students first investigate the transmission of light through different mediums and describe their observations. Then, students use that knowledge to investigate light refraction. 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 use their knowledge of Light to complete the DAPIC process using lasers to reflect and refract from mediums, creating a container.

- For example, after students learn about ecosystems and the flow of energy in food webs in the Learn By Doing STEAM Activity Reader, they can be provided with a writing activity in the STEAM Activity Guide. Students create a story about an animal that has its environment changed due to temperature. Students include what occurs and how their animal adapts to survive. Materials include assessments that allow students to apply knowledge and skills in novel contexts. For example, after students learn about how organisms interact with biotic and abiotic factors in the Learn By Doing STEAM Activity Reader, they can be provided with a performance task in the Assessment Guide. Students create a “diorama model to describe how a plant takes materials that are not food and creates matter that is food.”

TPS STEAM into Science Grade 5

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 for 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 resources that guide teachers in evaluating student responses. The Assessment Guide for Grade 5, Teacher Edition, includes performance tasks, such as for 5.6A, where students "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 performance task provides a rubric for evaluating student responses. The rubric is on a 4-point scale where a score of four states "students exceed all the required elements of the prompt." This evaluation support is incredibly vague, and the 3-point level says, "Students meet all of the required elements of the prompt. In this case, a teacher is to determine if students exceed the elements of the prompt, although the text doesn't indicate what the elements of the prompt

are. It also puts teachers in the awkward position of determining whether students meet the elements of the prompt or exceed, with exceeding the task yielding more points.

- 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.
- The teachers' editions inconsistently provide assistance for evaluating responses The Learn by Doing STEAM Activity Guide does not contain examples for student responses, while the Teacher Textbook offers guidance in red text.

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 program components. 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.

TPS STEAM into Science Grade 5

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 are provided with 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 found 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 in addition to 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.” The materials do not provide guidance on 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 how to respond 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 5

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.	DNM
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 do not 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.

- Some assessment tasks assume students possess background knowledge about geographic areas. For example, a “Science Makers” task asks students to pretend to be tour guides for visitors to the Grand Canyon in Arizona. While the activity includes the statement, “You should gather as many interesting facts about the canyon as possible to present as a talk,” the materials do not provide suggested resources for students who may have no knowledge of the Grand Canyon.
- The Grade 5 Assessment Database does not include correct responses for the majority of the questions included, so the accuracy of answers cannot be confirmed.

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 2, materials include images of a variety of animals focusing on their adaptations. During an investigation on water usage in the Student Textbook, materials provide a graphic of a water bill to examine and answer short-response questions. The graphic is created with a table and color-coding to clearly define different parts of the water bill. All required information for the investigation questionnaire can easily be identified.
- Materials include some pictures and graphics that are not clear. For example, the chapter on food chains and webs in the Student Textbook includes a picture of a food web in the “Test Yourself” assessment. Students use the picture to answer four multiple-choice questions. The

graphic contains only black labels of organisms found in a pond, connected with black arrows. The picture also contains illustrations of the sun in color, and the surrounding ecosystem in black and white. Some of the illustrations and arrows intersect with the organisms' labels, and the monochromatic use of black makes the picture difficult to read. In another assessment, students identify changes to ecosystems, which include an image of cows walking on grass with different shades of brown in the background. It is unclear if this image depicts the removal of plants, as asked in one of the questions.

- Materials use pictures and graphics that are developmentally appropriate. For example, in Learn by Doing Chapter 1, materials include an image of a food web. The food web is complex but complete with arrows representing the flow of energy, a picture of each organism, and their roles within the web.
- The grade 5 assessment database includes item #89 #92, both with an image. However, instead of the image preview, the questions display a broken image block indicating an error. Questions that would benefit from visual accompaniment to reflect the age-appropriate complexity lack any sort of media. For example, the question," What could happen if unequal forces act on a stationary object?" does not specify a scenario, connect to stimuli or include a visual as would be seen on STAAR.

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 #122 asked students to work alone, and #125 told students to work with a partner. All other questions offered no specific directions. 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. The only directions provided are "Check for the correct answer. Answer all questions. Do all the work on the test paper." The platform does not have any resources to support accommodations or guidance for teachers to do so while administering the assessment.
- The materials include some information that supports the teacher’s understanding of assessment tools and their scoring procedures. For example, the Teacher Textbook provides a summary of program steps that includes some information about administering assessment tools and scoring procedures. Assessment guidance states, “Use the Online Library - Assessment Generator - before completing the related activities following each story, have students verbally respond to Level 1 questions….Complete the activities. Use the Level 2 questions for the science content being taught and record results by students using the assessment matrix. This allows teachers to know if students have already mastered the content.” There is no specific information about the criteria to meet mastery, such as answering most Level 2 questions correctly or a certain number of questions correctly. The Program Guide provides a summary of assessment scores that should be inserted into the assessment matrix and report card. The guidance states, “For each test, grade and insert results onto the assessment matrix and transfer

to the report card. The results to record are those from the benchmark tests and all focus questions and performance tasks with rubrics." 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 Assessment Guide provides a scoring rubric for performance tasks but does not suggest any ways for students of varying abilities to demonstrate mastery of learning goals. For example, a performance task on changes to the Earth's surface includes a rubric that indicates students scoring 4 points "exceed all the required elements of the prompt." Materials do not include guidance for how students can perform a simplified task that holds true to the objective coverage.
- In Unit 5 of the Teacher Textbook, students complete an investigation outdoors where students section off a 50 cm square of earth and observe and record the organisms they find as well as other properties of the ecosystem, such as temperature. The materials suggest for teachers to, "Allow [emergent bilingual] students to express their ideas verbally. Once they understand, you can either have someone transcribe what they say, or you could allow them to copy the work of a reliable student." Materials do not provide accommodations for students of all abilities to show mastery of the learning goal.
- Materials provide suggestions for assessment accommodations but do not supply resources to perform the accommodation. The Teacher Textbook contains a Project-Based Investigation where students research renewable energy in Unit 4. The materials contain limited guidance for some students, stating, "Some students will need more direction with this Investigation. You could give them a specific simplified text to work from." Materials do not provide specific titles of simplified text or online resources that can be used.

TPS STEAM into Science Grade 5

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 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.

- The materials provide some support but do not ensure teachers can target instruction to develop precursor skills necessary to access grade-level content. For example, the Teacher Textbook, Project Based Lesson on cause-and-effect relationships of electric or magnetic interactions, provides some support to target instruction. The support at the end of the lesson states, “Some students will need further prompting to help them answer the questions at the end of the investigation. Have all students read a grade-level-appropriate text about magnetism. Have students work in pairs or small groups to answer questions about what they have read in the text. Students should also be allowed some time to consider the way in which the text has been written. Have students recognize the connections between sentences and/or paragraphs.” The guidance does not provide specific reading materials or questions, or address any objective for the outcome of the reading.
- 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.
- Materials provide embedded definitions and visuals in a text to clarify vocabulary and target instruction for student mastery. For example, in the Learn by Doing STEAM Activity Guide, the definition of mass is in big bold writing following an additional explanation and visuals to further understanding.

- Materials in the Teacher program guide state, " TPS has created a variety of art projects to help students master science content." However, those art projects are not aligned with the scientific concepts associated with the lesson from the Teacher's Textbook. For example, in Magic Math, students work on folding and cutting techniques, an early childhood skill.

Materials provide enrichment activities for all levels of learners.

- The materials provide enrichment through connections with ELA/Literacy and Mathematics. The Science/ELA activities invite students to write a poem using the terms physical properties, matter, prosperity, thermal, and solubility. Like in G4, the materials prompt students to develop a pictogram displaying data collected from measuring family properties. The STEAM Activity Guide offers enrichment and personalization for all levels through the Math/ELA Word Wall activity; for example, students research the Olympic Games summer sports to apply to understand balance and unbalanced force, mass, and motion. The materials allow students to select their own sport, giving them ownership of their learning products.
- 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 "The Mystery Matter Game!" consists of seven activities. In Activity 1, students investigate the separation of mixtures. Activity 2 focuses on reading comprehension, Activities 3-5 focus on math concepts, Activity 6 investigates the ability of a material to be an insulator and float, and Activity 7 focuses 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 "The mystery matter game?" idea box 3 asks students to identify materials based on their physical state and discuss which are mixtures.
- The Learn By Doing STEAM Activity Reader provides teachers with reading guidance. For example, the guidance states, “The STEAM Reader book has been designed for the teacher to read with students. However, in each chapter, there are reader short stories that allow the student to read an easier short story related to the larger text. Work with students to develop appropriate fluency (rate, accuracy, and prosody) and comprehension when reading grade-level text.” The guidance then provides specific student actions teachers can look for as they read and clear grade-level expectations for phonetic and spelling knowledge, such as “the spelling of words knowing the knowledge of prefixes.” The materials utilize this guidance during the reading and activity phases of the chapters. For example, in Chapter 5, Activity 2, students comprehend the Reader Short Story, “using text evidence to support their responses. Students are then asked, “Why is chemistry important to our daily lives?”

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

- The materials provide some recommendations for just-in-time scaffolds to develop productive perseverance of learning at the moment within activities. For example, the Science is a Verb lab found in Unit 3 of the Teacher Textbook includes an objective for the lab, background and preconception information, guided teacher questions for inquiry, and additional hints. The materials provide an answer key for questions found in the student textbook. The materials do not provide any specific just-in-time scaffolds in the lab lesson. There are no prompts, questions, or notes embedded into the lesson during the lab portion. All the information is located at the beginning of the lab. The Introduction section of the Teacher Textbook describes Science as a Verb as “associate short labs, which help teachers to direct a science concept and engage

students in hands-on interactive learning. This resource also provides support for teachers who are more comfortable with inquiry-based learning ... .Students are required to complete these short labs, yet the critical portion of any lab is to have a thorough discussion of the results and student thinking after the experiment is completed."

- The lessons include some recommendations for just-in-time scaffolds to develop productive perseverance in learning at the moment. In Grade 5 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 5 idea box 1 prompts teachers to discuss the difference between the mass of an object and its weight but does not provide guidance for teachers in this discussion. On the other hand, idea box 2 provides guidance for the teacher to maintain engagement by visiting the USA Mint site to look at the percentages of metals in different coins to reinforce that not all metals are magnetic. The lessons located in the STEAM Activity Guide do not include just-in-time scaffolds to develop productive perseverance of learning at the moment. The "Lazer Razzle Dazzle" lesson includes teacher guidance as students test the lasers, but does not include questions for the teacher as a means of supporting students as they struggle to maintain engagement on a demanding task. 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 offer some scaffolds to accelerate learning for all students. The At Home section of the Teacher Textbook provides students with prompts to explore tools and their use in their home environment. The materials recommend that students consider why people use certain materials to make specific products with questions like, "Why a saucepan metal?" The support here, however, is in materials at home, which would not be just-in-time and doesn't allow the teacher to learn from the materials about how to address student needs through learning acceleration.

TPS STEAM into Science Grade 5

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 multiple 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 materials provide several instructional approaches to support students as they develop material of the content. For example, the chapter on Earth and Space contains a lesson beginning with students working in groups of 3 to create a model of fossil fuels. After group reflection, the class comes together to observe a teacher demonstration to observe the impact of destructive forces on the rock. Conceptually, the instructional approaches provide the necessary variation. However, the investigative approach requires a drill and masonry drill bit, tools that students are not likely to have experienced at the Grade 5 level of development. The portion, Properties, incorporates various developmentally appropriate approach concepts. For example, the section includes grade-appropriate text with identified terminology, reflection questions, and guided inquiry.
- For example, Activity 2 “Decomposers” in Chapter 1 of the Learn By Doing STEAM Activity Reader Book has students use tools to measure and collect data as they test the effect of soil on decomposition. Materials engage students in the mastery of the content through a variety of developmentally appropriate instructional strategies. For example, a 5th-grade lesson on ecosystems in the Teacher Textbook includes an investigation to help students understand the

cycling of matter within living systems. Students “design a make-believe ecosystem that includes producers, consumers, and decomposers, and that is consistent with established scientific principles.”

- For example, in the Teacher Textbook Investigation portion of “Earth’s Changing Surface,” The preparation guide states, “Students can work individually or in pairs, or in small groups for this task.”

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

- The materials provide teacher guidance and structures for the implementation of multiple types of practices. For example, the Learn By Doing STEAM Activity Reader provides an introduction that provides guidance on different components used throughout the lessons in the book. This includes guidance on grade level expectations on the Scientific Method, developing research plans, the Design Engineering Process, and activities and pacing. Some guidance is limited such as the pacing of activities, which states, “If activities require skill sets that are not at the level yet mastered by students, return to them later when each student is ready.” The introduction outlines multiple types of practices, including hands-on investigations, teacher read-alouds and discussions, research, reading comprehension activities, and math-focused activities found within each chapter.
- The materials support a variety of instructional groupings during lessons. For example, Activity 3, “Force,” from Chapter 8 of the Learn By Doing STEAM Activity Reader Book, directs teachers to create groups to test one variable using the ramps. The materials support a variety of instructional groupings. Lessons on core content involving text in the Teacher Textbook are provided to the whole group, while investigations sometimes provide suggestions for “pairs or small groups.” For example, the “Preparation” section of the investigation “Water Cycle Model” prompts teachers to “divide students into pairs or small groups.”
- For example, during a project-based lesson, students are to work in pairs or groups to organize a field trip to a site where renewable energy is generated. Materials support groupings such as one-on-one instruction. Each lesson ends with challenges such as Test Yourself, Math Challenge, and Literacy Challenges. These challenges are to be completed independently to evaluate the student's knowledge. For example, the Test Yourself section in a lesson on conservation consists of 4 multiple-choice questions, and the Literacy Challenge asks students what ways they think they can conserve water at home.

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 must provide 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 for how to implement these structures effectively in a science classroom.
- The materials provide some teacher guidance for the implementation of multiple types of practices. For example, the Learn By Doing STEAM Activity Reader provides an introduction that provides guidance on different components used throughout the lessons in the book. This includes guidance on expectations on the Scientific Method, developing research plans, the Design Engineering Process, and activities and pacing. Some guidance found within the introduction is limited, such as the pacing of activities, which states, “If activities require skill sets that are not at the level yet mastered by students, return to them later when each student is ready.” Materials do not provide structures or guidance on how to assess students on their skill set for each chapter and set of activities. The materials do not provide structures such as rubrics to help teachers implement student feedback during activities that may include the Design Engineering Process.

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

- The STEAM Activity Guide intentionally includes illustrations of physically diverse students. The STEAM Activity Guide does not reference characters or students often. The few examples reflect lighter-skinned illustrations. Illustrates and characters' names reflect the intentional incorporation of diverse community members. For example, the characters in chapter 8. The illustrations reflect a variety of genders, skin tones, and hairstyles.
- Materials represent diverse communities using information that is respectful and inclusive. For example, the information provided in “The Science” section of the lesson “Environmental Changes” describes the results of Europeans bringing rabbits to Australia. 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.
- 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 studying the matter in a basketball. 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, the icon is used to represent students engaging in group activity consisting of a group of students of different ethnic backgrounds.

TPS STEAM into Science Grade 5

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 commensurate with the beginning and intermediate levels of English language proficiency as defined by the ELPS. The materials do not provide differentiation of support for more advanced levels of English language proficiency. For example, the Grade 5 Teacher Textbook suggests students "work to internalize new basic and academic language" throughout the lesson. Students are encouraged to "use, and repeatedly reuse, such language meaningfully during both speaking and writing activities." Other accommodations suggested include "discussing vocabulary meaning" and "working in pairs to read and speak new pieces of language."
- Materials include linguistic accommodations for ELLs at the end of each lesson but lack authentic linguistic accommodations commensurate with various levels. For example, the lesson on Light states that ELLs should be able to express their answers aloud and learn the vocabulary to use in their speaking. The STEAM Activity Guide includes the ELPS in the front matter of each chapter. In Matter and Energy, the materials recommend teachers use "prior knowledge and experiences," "prior knowledge to understand meanings," and "prior experiences to understand meanings." However, the materials do not address the proficiency levels described in the ELPS, such as differentiated sentence stems or graphic organizers. The materials do offer text and hands-on experiences to support language acquisition. While the materials cite the ELPS and include some teacher guidance, this guidance does not extend to differing levels of English proficiency.
- 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, “Force 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 encourage strategic use of students’ first language as a means to linguistic, affective, cognitive, and academic development in English. For example, in a 5th-grade lesson on forces, teachers are prompted to have ELLs “work amongst native speakers” and “copy the written work of another student.” 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.
- Materials do not directly encourage the use of students’ first language as a means to linguistic, affective, cognitive, and academic development in English. For example, 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 6, Idea Box 1 states, “Run through a day, and create a list of sources of potential energy. It could include breakfast, gas used to fuel a car, and batteries in a device. Then mindmap how that potential energy is turned into kinetic energy.” 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 access content knowledge of complex concepts such as potential and kinetic energy. There is no mention of first-language vocabulary cards or visuals. Therefore, using a first language is not strategic as a means of linguistic, affective, cognitive, or academic development.
- The materials do not support students' use of their first language. An "extra" activity in the Amelia Rose Explore portion of the STEAM Activity Guide directs students to write a sample containing all vocabulary from the chapter. The guidance includes the instructions, " Students should combine routine language with their growing vocabulary." The recommendation to use "routine language" is the closest reference to utilizing the students' first language as a tool to assist concept development. The STEAM Activity Guide provides activities such as Stop, Look, Think! to address earth Science content. The activities provide linguistic scaffolds to conceptualize the relationship between the sun, moon, and earth. The materials do not recommend using the student's native language to support language acquisition skills.

TPS STEAM into Science Grade 5

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.	PM
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 detailed information to share with caregivers about the design of the program through a Family/Caregiver Guide. For example, the guide includes a glossary of key vocabulary terms for grades K-8 and asks caregivers to review terms with their children throughout the course of the year. Materials provide information to share with caregivers about the design of the program through a Family/Caregiver Guide. For example, the guide includes a section on Family Support that provides information on how caregivers can “help enforce some of the requirements of the TEKS at home.” The materials provide an elementary and secondary example and explain the online components available to caregivers.
- Materials provide at-home practice activities for caregivers to help reinforce student learning and development. For example, in the Teacher's Textbook lesson on Forces, an inquiry was provided for caregivers. The support suggests families discuss the forces used around the house and how. However, it is unclear how caregivers are supposed to be aware of the at-home practice activities provided. Also the material doesn't provide any background just in case the caregiver isn't familiar with the material. In the Teacher's Textbook project-based lesson on Speed at home, students must write a report about one historical event that involved speed. The materials provide the caregivers with guidelines that must be included in the report. However, it is unclear how caregivers are supposed to be aware of the at-home practice activities provided, also the material doesn't provide any background just in case the caregiver isn't familiar with the material.
- The Family/Caregiver Guide offers Program Introduction, a section describing the TPS's general approach of "having students read about the subject" combined with inquiry-focused instruction. The introduction continues to include additional references and ends with "Students learn by doing," a statement reinforced by the Learn by Doing STEAM Activity Reader Book in

each grade level. The materials provide information for caregivers to understand each of the program's components, both in print and digitally. For example, the Family/Caregiver Guide offers images and descriptions of individual sections of the Learn by Doing STEAM Activity Reader Book, such as the story, "Idea Boxes," activities, keyword lists, and traditional lessons.

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

- The materials provide some resources and strategies for caregivers to help reinforce student learning and development. For example, “The Water Cycle” lesson in Unit 4 provides an activity instructing students to “complete the literacy and math challenges as homework.” The Support section provides guidance for caregivers, stating, “Students could experiment with evaporation at home, for example, by hanging wet fabrics of different colors and materials on a line outside to see which dries first.” While the materials provide at-home activities, they do not include information needed for caregivers to help reinforce student learning and development. Each Traditional Textbook Lesson in the Teacher Textbook has a “Homework” activity. For example, the “Ecosystems” lesson in Unit 5 provides an activity, instructing students to complete the literacy and math challenges as homework and “ask students to write an account of how they carried out the investigation and what they discovered.”
- Materials provide at-home practice activities for caregivers to help reinforce student learning and development. The Support section provides guidance for caregivers, stating, “Students should be encouraged to investigate ecosystems in their local area, such as wildlife reserves or ponds.” While the materials provide at-home activities, they do not provide a print version or a rubric of the investigation account, nor are they included in the student textbooks. The materials do not provide caregivers with information, examples of different ecosystems, or questions caregivers could discuss with their children.
- The guide for families suggests “Family Visits” to reinforce student learning and development. The list contains five suggestions: Texas Park, Texas Coast Wetlands, Texas Fishery, Texas Wildlife Reserve, and Gulf Coast Beach. The materials direct parents and caregivers to "ask your family member what studies they have completed that relate to these locations and discuss their thoughts and reviews." The support does not assist families with understanding the current concepts to reinforce. Additionally, the guidance relies on students connecting instruction to application in a park, wetland, reserve, fishery, or beach. The materials include the Family/Caregiver Guide to assist families with supporting concepts at home. The guide contains a glossary for each grade level, K-8. Words in the glossary's fifth-grade section include content terms such as "magnetic" and general science vocabulary like "matter." The materials include definitions as well. The glossary is listed alphabetically without breaks by content or unit. A parent would require direction to know which terms to master in any given unit. The 172-page resource contains all content, TEKS, glossary terms, etc., for all grades K-8, without differentiation on using the materials in a specific grade level or for mastering any given content.

Materials include information to guide teacher communications with caregivers.

- Materials do not include teacher guidance for communicating with caregivers. The Program Guide includes suggestions for activities completed at home, including embedded art projects. For example, in the Matter and Energy Unit in the STEAM Activity Guide, an activity is provided where the Teacher Note states, “If you are not permitted to have heat equipment of any nature,

you will need to ask for parents/guardians to help carry out this whole experiment at home." The materials do not provide any guidance for communicating at-home assistance with caregivers. Materials do not include teacher guidance for communicating with caregivers. The Program Guide states, "The Family Guide states how caregivers might communicate with teachers and students throughout the school year." This exact wording appears in the Parent/Caregiver Guide, but no other guidance on how caregivers might communicate.

- The materials do not provide a list of requirements such as clear and accurate information including at least two resources, and contains a conclusion." The At Home guidance does not assist teachers with communicating with families in this example. Instead, the direction extends homework. The Teacher Program Guide includes a section entitled Progress Monitoring, where the materials reference a report card, a tool used to communicate mastery with families. The materials describe benchmark tests, focus questions, homework, and performance assessments. However, the materials do not include any specific supports to assist the teacher with sharing student progress with caregivers. The Teacher Textbook offers an At Home section with support for families. In an example addressing speed, the section states, "Have students write a report about a historical event that involved speed."
- The materials provide little teacher guidance for communicating with caregivers. In a Project Based Lesson in the Teacher Textbook, materials state that "students will need to ask for parental/guardian permission before using any items found" in a STEM Homework Activity on energy. The materials do not include teacher guidance for communicating with caregivers. The Teacher Program Guide includes a section that highlights the "role of the family," which states "how caregivers might communicate with teachers and students throughout the school year" is provided in the Family Guide. 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.

TPS STEAM into Science Grade 5

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.

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 5

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 5

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.

TPS STEAM into Science Grade 5

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 5

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 5

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 5 is titled “The Mystery Matter Game!” and one of the short stories is titled “The Tennis Match,” neither of which 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 Name the Scientist the text fills nearly all the page spaces. Sometimes the use of white space is inconsistent, such as in the section on Mixtures in the textbook. The Science section provides almost no white space at the beginning of the text and then has some around a piece of clipart and then very little after that. Later, in another The Science section, some paragraphs have white space between them while others do not. Then at the end of the text, there is a very large amount of white space, which is an example of the white space not being used in appropriate amounts to support learning.

- The materials do not provide a design that supports student learning in the Learn By Doing STEAM Activity Reader Book. For example, in Chapter 3 The Sun, Moon, and Oceans, some text from the story is in black, some in red, some in blue, and some in green. This is very distracting and could cause issues for students with visual impairments. Later in this same chapter, There is a section that has almost no white space and there are two different font types with one appearing to be bolded with no apparent reason for the difference in font types.

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. For example, in Chapter 2 of the STEAM Activity Reader Book, there is a haphazard collection of actual photos and clipart that, while briefly referenced in the text, are more visually distracting than they are supporting learning. In this chapter, one page has a photograph of a cheetah, an image of a Speed Limit 65 sign, a clipart image of a flower, a clipart image of a hummingbird, and a clipart image of a baby crying. These images seemingly compete with the text rather than supporting learning.
- The STEM activities in the STEAM Activity Reader Book, Student Edition, include images that are distracting and do not support student learning. For example, in Chapter 1, Hit that Ball! two clipart images take the majority 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 are overwhelming and visually distracting. For example, The story Tennis Court Discovery includes several charts that include large amounts of information and include some fonts that can only be viewed when zooming up to 300%. The amount of information on these charts is visually distracting.

Materials include digital components that are free of technical errors.

- Materials include digital components that are free of technical errors. For example, in the Teacher Textbook, Properties, student lab handout materials are free of wrong answer sheets to problems. In the Teacher Textbook, States of Matter, teacher digital materials are free of inaccurate content materials or information.
- The STEAM Activity Guide includes activities that are free of inaccurate content information, but do have some grammar choices that may distract students. For example, in the story “Does Kevin Need Three Types of Energy?” the story describes Kevin as “blow waving his hair,” an unusual expression.

TPS STEAM into Science Grade 5

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.
- The materials include tasks that require students to access online resources. Materials do not provide specific links or guidance for student tasks. For example, in a “Science Makers” task from the Assessment Guide, students are to use “the internet and other reference materials” to research Newton and his laws of motion. Materials do not include specific guidance for students to use the internet for research.
- 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. The Digital Frog Library is not available for review. For example, the Alaska Library offers a DVD with a plant coloring book and the sounds of Alaskan animals to support and extend student activities. The STEAM Activity Guide contains descriptions of digital activities using the TPS Digital Frog Library and TPS Alaska Library. For example, students research a location in Alaska to research air pollution and air quality. The materials provide teacher guidance to facilitate students' comparison to a city known for its struggles with smog.

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. Materials identify online content but do not provide access. For example, the Teacher Textbook includes a Project that implements the engineering and design process to solve a problem using scientific ideas about magnets. The introduction to the lesson utilizes the TPS Alaska Library, stating, “Use the DVD and Alaska book plus online content to find the Trans-Alaska pipeline.” The teacher uses the digital content to lead a discussion on the problem the pipeline solved and how it was designed. The Alaska DVD was not accessible to review.
- Materials refer students to outside sources, such as websites, for tasks. For example, the task “Cycling of Earth’s materials trading cards” includes the internet as a resource students can use to help in the creation of their trading cards. Materials do not include further detail to support how the materials can or should be used. In the Learn by Doing STEAM Activity Guide, Chapter 4, teachers are told to allow students access to their school's internet and books to research a dinosaur with teacher guidance. However, there are no actual digital tools provided within the actual materials.
- Although the materials include online assessments in the Interactive Assessment Tool, they do not integrate digital technology to support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content. Materials do not include interactive resources for instruction, such as videos or interactive labs.

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 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.
- The materials provide general information to recommend activities for students to complete, but not necessarily with collaborative practice. For example, in an investigation of day and night patterns in the Teacher Textbook, students use the internet to find the times of sunrise and

sunset for four different locations. Materials do not use digital platforms as a collaboration opportunity. All data recording and sharing is done on paper and verbally through discussion. Materials provide no additional details to assist teachers with designing intentional collaboration.

- While materials provide suggestions for using collaborative digital tools, they do not provide specified opportunities for teachers and/or students to collaborate. For example, a materials list for a partner or group investigation on deforestation states that Google.doc or Google.draw can be used, but the lesson plan provides no explicit instructions on using digital tools for collaboration. The guidance of the Teacher Textbook specifically states, "Your teacher will assign you and your partner or group a topic to research, take notes on, and share with the 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.

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 5

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.

- 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 a rationale for the age-appropriateness of digital components in the Assessment Guide. For example, the “Museum room design” task lists the internet as one of the materials needed to use but does not provide samples of websites or videos that are appropriate for 5th graders to collect information from for this task. Activities in the STEAM Program Guide without direct access. Guidance in the program guide summarizes content-related opportunities, but the resource does not allow access.
- Materials do not provide a rationale for the age-appropriateness of digital and online components in the Learn by Doing STEAM Activity guide. Materials lack many digital and online components so a rationale isn't present. Materials state, "If the activities require skill sets that are not at the level yet mastered by the students, return to them later when each student is ready." Materials don't provide information that identifies how online and digital components align with grade-level science knowledge and skills. The Learn by Doing Activity Guide offers tips on grade-appropriate strategies to use with the materials, ranging from reading guidance, comprehension skills, composition, developing a research plan, vocabulary, scientific method, classroom safety, and the design engineering process. However, none of these tips refer to online and digital components, only print.
- Materials provide online components that could be developmentally appropriate with proper teacher supervision but do not provide explicit guidance on the grade-level appropriate use of

the Internet as a research tool. For example, the Teacher Textbook integrates the use of the Internet for students to research a major Texas project and complete a set of research notes on the assigned project. The materials provide a list of Texas project names to use but do not provide links to use or guidance on internet search safety and using reliable internet sources. Materials provide activities that could be grade-level appropriate with proper guidance but do not support the proper supervision of internet use. For example, the Teacher Textbook provides a lesson where students use the internet to research various climate zones and collect data about temperature, rainfall, and location. The materials do not provide specific websites or teacher guidance on proper internet use for research.

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. For example, the Teacher Textbook includes A STEAM Homework Activity in Unit 2. Students research “one of the smallest natural objects” and “one of the largest natural objects on Earth,” creating a Venn diagram to present the results. The materials state, “During this exercise, students should draw on information from multiple print or digital sources….To aid students with their research, supply them with links to resources such as online museums, libraries, professional organizations, and private companies.” The lesson plan does not provide specific links or guidance on possible student responses to aid teachers.
- The STEAM Activity Guide offers a summary of Digital Frog activities that align with the chapter content. The materials do not include logistical support such as instructions for accessing resources, tips for navigation, or information for troubleshooting common issues. The STEAM Activity Guide includes TPS Digital Frog Library and TPS Alaska Library activities. One example is the matter and energy chapter, which asks students to "discuss what property types can be used to classify animals." The materials offer additional questions for students to review using the resources in but do not provide information on how to use the platform.
- The Assessment Guide includes some tasks that list the internet as material needed for completing the activity. For example, the "Cycling of Earth's materials trading cards" task lists the textbook and internet as materials but does not include specific teacher guidance for embedding technology within the task. 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 provide troubleshooting tips for common problems teachers may encounter.
- 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 materials state, "Please refer to your school's computer safety policy for work that involves students using computers and the Internet." Materials provide an Essential Content Guide, showcasing which chapter may have technology integration. Materials do not include recommendations to teachers on which days to use technology with students or a time within a chapter to use technology to enhance a lesson.

TPS STEAM into Science Grade 5

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 "provide 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.