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

Section 3. Knowledge Coherence

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

Section 4. Productive Struggle

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

Section 6. Progress Monitoring

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

- The assessments are partially clear and easy to understand.

Section 7. Supports for All Learners

- The materials provide 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 partially include a variety of 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 practice and review opportunities that support instruction.
- The materials include some classroom implementation support for teachers and administrators.
- The materials provide some implementation guidance to meet variability in program design and scheduling.

Section 9. Design Features

- The visual design of materials is sometimes clear and easy to understand.
- The materials are not 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 do not 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.	PM
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

Partial Meets | Score 2/4

Materials partially meet the criteria for this indicator. Materials are partially 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 some 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, plan and conduct classroom, laboratory, and field investigations, and 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 5 materials provide opportunities for students to develop and practice scientific and engineering practices (SEPs) as outlined in the TEKS. For example, students investigate the decomposition of food using the Scientific Method to conduct a descriptive investigation and analyze and interpret data to derive meaning. The materials outline the use of engineering practices to investigate fifth-grade-appropriate content concepts. Students engage in phenomena of how engineering solutions have changed our lives. Students identify a problem in their own lives and work through the engineering process to identify a possible solution to test out.
- Grade 5 students investigate the physical properties of sand, water, and sugar before combining the substances to create mixtures. Students then hypothesize how they will separate the

materials after being mixed. Students explore options for filtering some substances and identify the need for additional options regarding the salt water mixture. The materials allow students to evaluate observations, identify a problem or challenge cause, design a solution, implement, monitor, and test. These activities highlight the application of the engineering design process beyond physical models and encourage students to see data analysis applied to real-world problems. The grade 5 materials provide at least one investigative opportunity in every chapter in addition to a Recurring Themes and Concepts focus. However, documents do not clearly specify skills developed in each investigation, nor are the students responsible for posing the questions to examine.

- The lesson on properties in the *Teacher Textbook - Grade 5 Science* provides students opportunities to develop and practice SEPs through a hands-on activity where students design and test a cover to keep a freshly baked potato warm, using the steps of the engineering design process. The *STEAM Activity Guide - Grade 5 Student Edition* provides students with opportunities to develop and practice SEPs through the investigation of lasers. Students investigate how lasers can be reflected and used to activate a switch. Also, the Heat lesson in the *Teacher Textbook - Grade 5 Science* provides opportunities for students to use the SEPs learned previously to design, conduct, and plan a series of experiments using tools to classify objects as conductors or insulators.

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

- Materials include opportunities for students to make connections within, but rarely between, overarching concepts using recurring themes. Most lessons provide connections to the recurring themes within concepts. For example, Chapter 1 of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* talks about ecosystems, and in Activity 7, articulates that “the purpose of this activity is to demonstrate an understanding of the ecosystem as a system.” However, there is no connection made between ecosystems and other systems between overarching concepts, such as circuits, weather systems, or the effect of force on objects in systems.
- Materials include some opportunities for students to make connections within and between overarching concepts using the recurring themes. Some of the *Teacher Textbook - Grade 5 Teacher Edition* lessons provide opportunities for connections to the recurring themes within concepts but not between. in lesson 7A, B - TRAD - Patterns of Motion, the focus is on patterns and how certain motions occur in a predictable pattern. The student activities, questions, and homework activities focus only on patterns of motion, which are patterns within a concept. There are no connections to patterns between concepts such as patterns in the seasons, patterns in the structure of plants or animals, or patterns in weather systems.
- The materials provide some connections between and within overarching concepts through the narrative texts in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*; however, while the text weaves stories of different science disciplines together, this doesn’t equate to an opportunity because the direct connections between the concepts are not articulated fully by the materials, either by questions posed to students, or guidance provided to the teacher to make the connections.

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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 - Grade 5 Teacher Edition* contains idea boxes and focuses on STEM careers that explain, describe, and make connections to develop conceptual understanding. Also, the materials systematically develop students' content knowledge and skills appropriate for the concept. For example, the grade 5 lesson on ecosystems begins with students building a food chain, which builds on student learning from grade 3, then a food web, built on grade 4, to predict the relationships of organisms in an ecosystem.
- In grade 5, a lesson sequence within the Force and Motion unit requires students to investigate and explain how equal and unequal forces acting on an object cause patterns of motion and transfers of energy, building on previous learning about the patterns of force in grade 4. Materials provide guidance for teachers to elicit students' previous learning experiences. Materials in the *Teacher Textbook - Grade 5 Science* demonstrate 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.
- The materials arrange concepts to explore systems such as forming sedimentary rock and fossil fuels. The content begins with everyday observations of water on land and continues to connect the water cycle. The materials encourage students to further their thinking by considering the role of water, sedimentation, and gravity on matter. Chapters connect content with previous content. The materials include an Essential Content Guide with the progression of content detailed. The materials begin with an investigation into the organisms in an ecosystem, then continue to the flow of energy, comparisons of structures and function, and survival. The content continues to zoom out to address patterns seen from Earth, in space, and on the ground.

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

- Grade 5 materials provide opportunities for students to make connections across disciplines to develop an understanding of science concepts. Students make connections between science and literacy in activities focused on reading comprehension, research, short composition writing, and understanding vocabulary words and terms. Students connect science and literacy when responding to open-ended questions after an outdoor investigation and reading connection.
- The *Teacher Textbook - Grade 5 Science* provides sufficient opportunities for students to ask questions and plan and conduct investigations. For example, the What Will Conduct Electricity? lesson provides guiding questions the teacher can ask to help students investigate the creation of a circuit using various materials to act as a conductor. The *Teacher Textbook - Grade 5 Science* provides sufficient opportunities for students to engage in problem-solving to make connections across disciplines. For example, students make connections between science and literacy when they create an investigation to determine what materials will best conduct electricity. Students use the scientific method to conduct an experiment and record their results.

- The materials encourage students to add questions to the teacher-generated inquiries in several activities. For example, in grade 5, Chapter 5, the materials list five potential questions for the students to research and then tell the teacher, adding that “[students] should add one or two questions of their own.” The grade 5 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. The Project-Based Lesson portion addressing Matter and Energy supports student inquiry while studying chemical changes. The materials support student-generated questions and planned investigations. The materials guide teachers to encourage students to consider investigations in different settings, such as in the field or laboratory.

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

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

Evidence includes but is not limited to:

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

- Materials embed phenomena in some instructional components to support students in constructing, building, and developing knowledge. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*, the materials provide narrative texts that provide access to phenomena that provide a springboard for learning. However, in the *Teacher Textbook - Grade 5 Science,* most of the chapters begin with Teacher Guided Questions to Inquiry, which provides a series of questions for the teacher to ask the students to begin the learning cycle. While the questions are designed well, they are not a replacement for observing phenomena.
- Materials provide opportunities for students to develop, evaluate, and revise their thinking as they define problems. In the *Teacher Textbook - Grade 5 Science*, some project-based lessons center around phenomena. Students then design solutions. However, the ideas presented for problems to be solved are not phenomena-inspired ideas. They are problems presented by the teacher.

- The materials provide problems for students to address; however, the problems are often embedded with a specific expected outcome provided by the materials and not created by the students, making the application and performance of engineering practices less than authentic. For example, in Chapter 3 of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*, students are presented with a Design Challenge to "design a solution to improve reuse or recycling at home or at school." There is no authentic problem the students are solving or any relevant context for this activity; the materials simply tell the students to complete the task.
- The materials provide some direct connections to the recurring themes and concepts across disciplines as the TEKS require. For example, there are opportunities for students to consider cause and effect relationships as they relate to equal and unequal forces, but there are no opportunities to make a connection to how that also relates to cause and effect with regard to how changes in abiotic factors can affect biotic factors.

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

- Materials leverage students' prior knowledge and experiences related to phenomena and engineering problems. For example, in the *Learn by Doing STEAM Activity Reader Book - Grade 5 Student Edition*, students design a system to improve the disposal of materials to reduce the negative impact on the environment. Students monitor the current situation, create a solution, test, and improve. The materials leverage students' prior knowledge by asking about their recycling or garbage collection at home or school. In the *Learn by Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*, conservation is described in the chapter text, Idea Box 5, and Activity 10. This builds on experiences in prior grades where conservation is introduced, i.e., in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*. The concepts are then reintroduced through both the *Teacher Textbook* and *Student Textbook - Grade 5 Science*, as well as both teacher and student editions of the *STEAM Activity Guide - Grade 5*.
- The materials provide opportunities to leverage student experiences in Chapter 6, where the topic is energy. In the *Teacher Textbook - Grade 5 Science*, instructors are provided an overview of accessing students' prior knowledge and leveraging the learning. In the lesson plan in the *Teacher Textbook - Grade 5 Science*, educators are advised to check knowledge before moving on. The materials initiate the topic with a story regarding a shared experience. To facilitate student connections, a note in the Idea Box suggests students consider a day in their lives to determine where energy impacts them. Other examples include prompting students to view everyday objects found in a home or business, such as a light switch.
- Materials provide teacher guidance about potential student misconceptions related to students' prior knowledge. Grade 5 materials provide a Common Misconceptions section to assist teachers in identifying inaccurate or undeveloped prior knowledge.

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 phenomena and engineering problems in some program components. The materials indicate phenomena before each Project Based Lesson and in the *Teacher Textbook - Grade 5 Science.* The example addressing Earth and Space states, "Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment." The following materials direct students

through activities addressing the phenomena through scientific investigations, data analysis, and reading comprehension questions.

- The materials clearly outline for the teachers the scientific concepts and goals behind each phenomenon and engineering problem in the *Teacher Textbook - Grade 5 Science*. For example, a lesson on water recycling outlines the lesson goal: “Students will use cups of warm water to cause evaporation and condensation. They will use this experiment to create their own water cycle and explain how heat, evaporation, and condensation are important aspects of the water cycle. Students will also observe how mass is conserved through a system.”

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Indicator 3.1

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

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

Meets | Score 6/6

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

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

Evidence includes, but is not limited to:

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

- The *Teacher Program Guide - Grades K-8 Science* describes 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 narrative texts in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* are followed by multiple activities for students to engage in. Materials state, “These activities build upon communication, creativity, critical thinking, and collaboration.” Materials also include a flowchart to show horizontal alignment. The *Learn By Doing STEAM Activity Reader* 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.
- Materials are aligned and provide connections to prior knowledge. Materials offer a K-8 program and provide a grade-level vertical alignment document demonstrating how students build and connect knowledge across grade levels. The Teacher Supports show how the materials are vertically aligned. The document titled Horizontal and Vertical Alignment Information states, “As students progress within each grade, the STEAM storybooks are the first level in a series of

TPS curricular materials, horizontally aligned to allow the students to engage in a curriculum that builds on knowledge and skills aligned with the Texas Essential Knowledge and Skills."

- Materials introduce content through the text in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*. This text 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, *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* 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 connect new learning to previous and future learning within and across grade levels. In the *STEAM Activity Guide - Grade 5 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…" This clearly connects to previous learning about light and how it travels from kindergarten to exploring light energy in grades 3 and 4.
- 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 Scaffolding Information within the vertical progression for lessons in the *Teacher Textbook - Grade 5 Science*. 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. The materials provide the TEKS to fulfill vertical alignment and also embed the alignment with 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.

- The *Teacher Program Guide - Grades K-8 Science* describes the lesson progression with each resource. The guide explicitly states teachers begin each unit with the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* and then move to the exploration in the *Teacher Textbook - Grade 5 Science*. The *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* introduces all chapters with fictional characters asking and answering questions. Materials intentionally provide content information through the narrative text before students move to exploration. The lesson plans included in the *Teacher Textbook - Grade 5 Science* begin with students engaging with media, discussing what they understood, have seen before, or sparked curiosity. The teacher then begins the instruction, providing steps to complete the investigation if materials offer one.

- Materials in the *STEAM Activity Guide - Grade 5 Teacher Edition* do show progression through text from representational to concrete through stories (representational), hands-on investigations (concrete), and abstract represented through some research activities.
- Materials are intentionally sequenced to scaffold learning in a way that allows for deeper understanding. In a lesson on position and movement, materials 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. While this approach seems counterintuitive, it provides a unique opportunity for students to connect learning in non-traditional ways.

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

- 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.
- Materials clearly present core concepts and science and engineering practices (SEPs) through hands-on practice, investigations, and project-based learning. Materials also provide the science and engineering practices lessons at the end of the *Teacher Textbook - Grade 5 Science*. 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 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.
- The materials address the recurring themes clearly and accurately for individual disciplines. The RTC of systems is highlighted repeatedly through the materials with earth and space systems, ecosystems, and systems with respect to force and motion. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*, Chapter 8, Activity 1, students look at the pattern in data that is provided and make predictions based on the observed pattern.

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

- Mastery requirements of the materials are within the boundaries of the main concepts of the grade level. Materials include a broad overview or guidance document detailing increased depth and complexity across the year. Specific lessons include a description in the Scaffolding Information section with a content progression. For example, a Science and Engineering Practices lesson 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 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. The content describes boundaries and content limitations. An earth science lesson displays an objective at the beginning and ends with a discussion about changes to the land.
- The mastery requirements are sometimes out of the boundaries of the main concepts of the grade level as outlined in the TEKS, as an appropriate challenge for some students. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher and Student Editions,* Chapter 6, the concepts of potential and kinetic energy are explored.
- Materials clearly define the boundaries of content that students must master for grade 5. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition,* Energy Everywhere, students are provided with text introducing parts of an atom and pitch, frequency, and decibels in relation to sound energy. At this age, students are assessed for investigating energy transformations in systems, including circuits.
- At times, materials appropriately go beyond grade-level-specific core concepts. For example, materials include a section on fossilization in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*. This is not content addressed in grade 5 but could be reviewed from grade 4. The grade 4 expectation is for students to use fossil evidence to describe past evidence. The *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* also describes the coins as alloys. The TEKS do not introduce metalloids until grade 6. Grade 5 students classify by solubility and demonstrate mixtures maintain properties of combined substances, as well as understand basic properties of the individual substances.

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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 partially meet the criteria for this indicator. Materials provide some 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 - Grade 5 Science* state, "Science Concepts, scientific practices, and engineering are introduced in this first component," in reference to the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*. However, neither the *Teacher Textbook - Grade 5 Science* nor the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* indicates how or when scientific practices or overarching concepts developed and connected over time. The inclusion of the Horizontal Alignment Chart, the TEKS 1-5 Content Guides, and pacing guide provide a document that shows when scientific and engineering practices and recurring themes are addressed. This does not support the teacher in understanding how instructional content within the program builds horizontally or vertically.
- The *Teacher Program Guide - Grades K-8 Science* 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 *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* 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 *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* provides 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 and how learning develops horizontally or vertically.

- 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. At the beginning of the Traditional lessons, in the *Teacher Textbook - Grade 5 Science,* the Scaffolding Information section provides some information on the 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, *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* 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 not help teachers understand how their specific grade-level content connects to prior or future learning.
- The materials provide little support for teachers to understand the alignment guiding the development of the recurring themes and concepts across disciplines as the TEKS require. For example, there are opportunities for students to consider cause and effect relationships as they relate to equal and unequal forces, but there are no opportunities to make a connection to how that also relates to cause and effect with regard to how changes in abiotic factors can affect biotic factors. The *Teacher Program Guide - Grades K-8 Science* mentions, “TPS help teachers to facilitate students to make connections between . . .recurring themes and concepts,” but there is little evidence in the materials of providing teacher support in understanding these and drawing both horizontal and vertical connections.

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 - Grade 5 Science*. For example, in the grade 5 lesson titled 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 - Grade 5 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 - Grade 5 Science* 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 - Grade 5 Science*.

- 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 - Grade 5 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 Book - Grade 5 Teacher Edition* 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 includes explanations and examples of science concepts. For example, the *Teacher Textbook - Grade 5 Science* provides teachers with information about living things in an ecosystem. The lesson plan provides a Background and Misconceptions 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.
- The materials provide explanations and examples of science concepts to support the teacher's subject knowledge. For example, the *Teacher Textbook - Grade 5 Science* provides a section titled The Science prior to traditional (TRAD) lessons and a Background and Preconceptions section in the Science Is A Verb (SIAV) lessons. These provide a thorough yet concise explanation of the science contained in the lesson and corresponding activities.

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

- Materials provide a purpose or rationale for the instructional design. The *Teacher Program Guide - Grades K-8 Science* in the Support Notes for Teachers states that the content scaffolds as the characters go alongside the diverse students. The *Teacher Program Guide - Grades K-8 Science*, under the Support Notes for Teachers section, gives information about the rationale of how the program was designed. For example, "The STEAM storybook was designed with two key purposes: first to teach science through the prism of STEAM, science, technology, engineering, and math as an approach more relevant to the lives of students."
- Materials explain the intent of the instructional design of the program. The *Teacher Program Guide - Grades K-8 Science* describes the philosophy of science teaching and learning. They explain the publisher's philosophy that we learn best by doing and the importance of scientific understanding for all students. They also explain the science teacher's role in developing critical thinking, problem-solving, and an appreciation of the scientific process. The *Teacher Program Guide - Grades K-8 Science* describes the Teaching Pedagogy - Storytelling and STEAM. The guide references the research on structure strategies and more information on why teaching science through storytelling is important
- Materials provide an explanation of the goals of the program. For example, the *Teacher Program Guide - Grades K-8 Science* 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.”

TPS STEAM into Science Grade 5

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 consistently support 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 - Grade 5 Science* 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 - Grade 5 Student Edition,* 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 *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*. This is component 1 and provides conceptual understanding and a gentle introduction to the topic. 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 STEAM Activity Reader Book - Grade 5 Student Edition* content plus the content delivered in these lesson plans does meet this section.
- The *Teacher Program Guide - Grades K-8 Science* provides a philosophy of science teaching and learning as The materials provide teachers with guidance on labs in the "Science is a Verb" explanation found in the Teacher Textbook that partially supports sensemaking. For example, the materials state, "The critical portion of any lab is to have a thorough discussion of the results and student thinking after the experiment is complete. It is suggested you take as much time as the experiment to have this discussion with students. The real learning occurs not from hands-on experiments, but from a deep discussion of the experiment while making connections to the concept they are learning." The guidance supports sensemaking by taking the lesson beyond a hands-on investigation and building conceptual knowledge through discussion.

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 Reader Book - Grade 5 Student Edition*, 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 Reader Book - Grade 5 Student Edition*, 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 Reader Book - Grade 5 Student Edition*, 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.

- 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. 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.
- Materials provide multiple opportunities for students to engage in various modes of communication to display understanding. In a "Think and Craft" activity from the *STEAM Activity Guide - Grade 5 Student Edition*, 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 Book - Grade 5 Student Edition*, 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).

TPS STEAM into Science Grade 5

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 support students to act as scientists and engineers who can learn from engaging in phenomena and engineering design processes. For example, Activity 10, "Design Challenge – Conservation," in Chapter 3 of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* has students design and explain conservation solutions. Students follow the engineering design process to design a solution, test it, and make improvements as necessary.
- 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 - Grade 5 Student Edition*, 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 Book - Grade 5 Student Edition*, 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 - Grade 5 Science* 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.

TPS STEAM into Science Grade 5

Indicator 5.1

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

1	Materials prompt students to use evidence to support their hypotheses and claims.	M
2	Materials include embedded opportunities to develop and utilize scientific vocabulary in context.	M
3	Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and grade level.	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 evidence to support their hypotheses and claims. Materials include 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 of 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 outline the DAPIC - define, assess, plan, implement, and communicate - process in the *Teacher Program Guide - Grades K-8 Science*. The DAPIC presents a scaffold to help students use evidence to support claims. Teacher guidance in the Program Guide indicates that materials intend for teachers to use the DAPIC in practical investigations for students to communicate claims and solutions based on evidence.
- The materials offer prompts to use evidence to support claims and hypotheses. The *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* 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. 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 provide prompts for students to use evidence when supporting their hypotheses and claims. For example, the activity “Force” from Chapter 8 of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* prompts students to “record whether their hypothesis was correct and what they learned from this experiment.”
- The materials provide opportunities for students to develop how to use evidence to support their hypotheses and claims. 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 Book - Grade 5 Teacher Edition*, Chapter 1, Activity 2, students are provided with an opportunity to develop how to use evidence to support their hypothesis. In the *Teacher Textbook - Grade 5 Science*, 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 four scent balloons and then test if their partner can identify the smell in each one. Students record their responses and answer 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: 1) embedded in the text with bold letters and 2) key vocabulary charts. In Chapter 2 of the *Learn by Doing STEAM Activity Reader Book - Grade 5 Teacher Edition,* materials embed vocabulary within the text in bold letters with pictorials for most of the words. Materials present scientific vocabulary using keyword charts with the vocabulary word and its definition. In the lesson properties in the student textbook, materials provide a keyword chart with vocabulary words and their definitions.
- The materials support scientific vocabulary primarily through text and reflection questions. 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 using keywords. The *STEAM Activity Guide - Grade 5 Student Edition* 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 additional vocabulary support.
- 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 to teachers using 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 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 *Teacher Textbook - Grade 5 Edition* includes a Keywords section after the student reading that provides definitions for bolded words using student-friendly language. Many 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.

TPS STEAM into Science Grade 5

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 and/or discuss the results. The materials ask students to describe the interactions in the system in a physical science chapter. The *Teacher Textbook - Grade 4 Science* 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. *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* introduces aspects of 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." However, this misses the mark of argumentation; students are not developing an argument for their report based on evidence. Instead, they are reporting what happened or what they did.
- 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 Reader Book - Grade 5 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." After conducting the investigation, "students describe their results." The materials provide teachers with guiding questions, including, "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. However, it 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 - Grade 5 Student Edition*, 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 explain how the required words should connect to the debate or how to help students construct their arguments.

TPS STEAM into Science Grade 5

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 opportunities to defend a solution to problems but do not include opportunities to construct arguments based on evidence. For example, in the grade 5 design challenge Conservation in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*, students are prompted to create a poster. The criteria include describing the problem, the student's solution, and the solution's contributions to conservation. Students are not instructed to construct an argument that the poster should convey to justify the solution based on evidence before creating the poster.
- The materials provide some opportunities for students to communicate explanations but not construct arguments rooted in evidence to justify their explanations. For example, the Organisms and Environments Unit in the *Teacher Textbook - Grade 5 Science* 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 design their animal, they must justify why they chose to give their animal each of its features." The student materials do not include the expectation that students generate an argument based on evidence.
- The materials provide some opportunities for students to justify explanations of phenomena and solutions to problems using written and verbal arguments problems using evidence acquired from learning experiences. Instead, it is often limited to finding text evidence for reading comprehension questions. For example, the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* includes a Reading Comprehension activity for each chapter. The activity directions state, "They should use text evidence to support their responses." 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?"

TPS STEAM into Science Grade 5

Indicator 5.2

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

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

Meets | Score 4/4

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

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

Evidence includes but is not limited to:

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

- The materials provide 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 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.
- 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.”

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

- The materials provide guidance for students to develop scientific vocabulary in context. In the *Learn By Doing STEAM Activity Reader Book*, 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 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 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 list includes 30 words related to Earth and space.
- The materials provide 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 provide teacher guidance on preparing for student discourse and supporting students in using evidence to construct written and verbal claims.

- Materials provide 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. General guidance for student argumentation and discourse comprehension skills is provided. For example, materials state

"Speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively, listen and generate relevant questions to clarify and deepen understanding, gain information and make pertinent comments. Work collaboratively with others by following agreed-upon rules, norms, and protocols TPS believes that the teacher's application of the guidance above, together with prompts integrated into the activities, will provide information for the teachers to establish a classroom culture."

- Materials provide 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. 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."
- Materials provide guidance, for example, an activity investigating circuits in the *Learn By Doing STEAM Activity Reader Book* 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.
- Guidance is also evidenced for STEM projects appearing in the program within the information in the teacher program guide stating 'This approach is referred to by the acronym "DAPIC" - Define, Assess, Plan, Implement, and Communicate. Likewise, communication may be necessary at any stage of the problem-solving process. The DAPIC model allows for all of these variations.
- Materials provide teacher support in preparing students to engage in discourse. For example, the Scientific Method and Design engineering process section contains multiple guidance comments regarding discussions. The Comprehension Skills sections contain guidance on discussion and argumentation. For example, idea boxes are cited throughout the text as points of collaborative discussion, engaging the children in the topic. The idea boxes are designed to promote questions from the text they have listened to, provide opportunities to evaluate details, and synthesize and share predictions and inferences This allows a child to modify their understanding of the text read, discuss topics, and determine the basic theme using text evidence.
- Materials provide 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 Book* 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?".

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

- Materials provide teacher support for facilitating the sharing of students' finding solutions. Materials provide feedback, tips, and examples teachers can use to support students throughout the learning cycle. For 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 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.”

- Materials provide teacher guidance to engage students’ thinking in various modes of communication throughout the year. For example, the *Assessment Guide - Grade 5 Teacher Edition* includes sample responses to “Focus Questions” for the lesson Solving Problems. Specific guidance is provided about communication in the *Teacher Textbook - 5th Grade Science*. It states “Effective science communication is central to education, discussion and scientific argumentation. Not all scientists agree on everything, and when they disagree it is important that they can effectively use data, and current scientific ideas to communicate their reasons for their disagreements. Sometimes scientists must communicate complex ideas to the public. Most members of the public have a lower scientific understanding than a professional scientist, and therefore when communicating with the public it is important to deliver information in a way that can be easily understood. Encourage students to think about what they have learned in today’s lesson and discuss the different ways in which they could communicate what they have learned. You might instruct the class to write a newspaper article, create an educational video, or deliver a presentation. Discuss with students the importance of considering their audience when constructing their presentation. Students may create presentations to deliver to the teacher, each other or their parents/carers. Presentations may be delivered individually or collaboratively”. Misconceptions are also provided.
- Materials provide 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 include 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."
- Materials offer 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. 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 Book - Grade 5 Teacher Edition* 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 Mystery Artist chapter 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 Book - Grade 5 Teacher Edition*. The National Park Field Trip, Rocks, and Soil! chapter 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 - Grade 5 Teacher Edition*. The assessments contain a variety of formats that include multiple-choice questions, open-ended questions, and performance tasks. For example, the Matter and Energy unit in grade 5 contains four multiple-choice and four open-ended Science Assessment Questions. The performance task for this assessment asks grade 5 students to answer questions about a mystery substance in order to identify it.

- Materials provide diagnostic assessments. The *Teacher Program Guide - Grades K-8 Science* contains a section called Support Notes for Teachers. Within the Support Notes for Teachers segment 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 - Grade 5 Teacher Edition*, 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. 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.
- 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 ask, “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 - Grade 5 Science* identifies the TEKS that are assessed in formative and informal assessments. For example, the “What Have You Learned?” section of a grade 3 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 indicate which TEKS are assessed across the breadth of the course. In the *Teacher Program Guide - Grades K-8 Science*, the Progress Monitoring section describes the Focus Questions, Performance Tasks with Rubrics, TEKS by Chapter assessment questions, and Assessment Generator. Under Performance Tasks with Rubrics, the materials state, "For each TEKS, a performance task with a rubric is provided. Grade students and enter results onto the report card." The By TEKS, Chapter assessment questions at the end of each chapter, and the materials note, "The major assessment tools are those in the Online Library - Assessment tools." Under Assessment Generator, the materials say, "Teachers can create, save and print assessments to include chosen TEKS and skill levels. The tests can be personalized by the student or by class. Manual grading is required."

TPS STEAM into Science 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 Reader Book - Grade 5 Teacher Edition*, the assessments integrate scientific knowledge through informational fiction, science, and engineering practices. In Activity 7, students build a model of the Earth's and Moon's orbit. It focuses on the transfer of heat energy. 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 Reader Book - Grade 5 Teacher Edition*, 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 - Grade 5 Teacher Edition* 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?”
- The materials include assessments that require students to integrate scientific knowledge and science and engineering practices with recurring themes appropriate to the student expectation being assessed. For example, in the *Teacher Textbook - Grade 5 Science*, 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.

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

- Materials include assessments that require students to apply knowledge and skills to new problems. The *Assessment Guide - Grade 5 Teacher Edition* 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 - Grade 5 Student Edition* 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.
- In *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*, 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 - Grade 5 Student Edition*, students use their knowledge of Light to complete the DAPIC process using lasers to reflect and refract from mediums, creating a container.

- After students learn about ecosystems and the flow of energy in food webs in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*, they can be provided with a writing activity in the *STEAM Activity Guide - Grade 5 Student Edition*. 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 Book - Grade 5 Student Edition*, they can be provided with a performance task in the *Assessment Guide - Grade 5 Student Edition*. 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.	M
2	Materials support teachers' analysis of assessment data with guidance and direction to respond to individual students' needs, in all areas of science, based on measures of student progress appropriate for the developmental level.	PM
3	Assessment tools yield relevant information for teachers to use when planning instruction, intervention, and extension.	M
4	Materials provide a variety of resources and teacher guidance on how to leverage different activities to respond to student data.	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 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. Assessment 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.

- Materials provide information and/or resources for evaluating student responses in most program components. This information generally appears in red font in teacher-facing resources, such as in the *Teacher Textbook - Grade 5 Science*, which provides guidance in red text for evaluating student responses to every activity/question.
- The *Learn by Doing STEAM Reader Book - Grade 5 Teacher Edition* contains sample student responses to questions investigated during a culminating activity for the content TEKS under the Assessment section. This component also includes the Learn by Doing Assessment Rubric - Grade 5 as a resource for evaluating student responses. Materials include an assessment question or task followed by sample responses that determine mastery.
- For example, 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."

TPS STEAM into Science Grade 5

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

- Materials support teachers' analysis of assessment data but lack guidance and direction for responding to individual students' needs based on that analysis.
    - For example, while the Graded Assessment Database offers three levels (Below, At, and Above) to determine measures of student progress, materials lack teacher guidance and direction for using this assessment data to respond to students' needs.
    - The materials include an Assessment Matrix that lists the knowledge statements for core concepts to support tracking overall data for students but lack accompanying teacher guidance for utilizing data in the matrix to drive instruction.
    - The materials contain Intervention Focus Tutorial materials to assist students who are not meeting expectations, but this tool is not directly aligned with assessment data. Materials lack teacher guidance and direction for teachers to use the Intervention Focus Tutorial in response to their analysis of assessment data.
    - The *Assessment Guide - Grade 5 Teacher Edition* offers a range of tools for evaluation and questioning, including multiple-choice and open-ended questions and performance tasks. However, it lacks support materials or resources to help teachers easily analyze and interpret the data they collect.
- Materials lack specific guidance documents and resources to support teachers' analysis of assessment data. The *Teacher Program Guide - Grades K-8 Science* provides a series of actions to take in response to student data that is limited to assigning new assessment questions (higher or lower level depending on student performance), addressing vocabulary, or assigning an art project. This blanket approach within the general teacher guidance document does not meet students' individual needs, which are often more complex.

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

- Materials provide various assessment tools and resources, including embedded questioning in student materials, an assessment guide, and an online assessment generator that can be used to support teachers when planning instruction, intervention, and extensions. The information gathered from the assessment tools helps teachers when planning core science and differentiated instruction. Additionally, the materials extend sample responses and rubrics to assist teachers in evaluating student responses and responding to individual students' needs.
    - The Assessment Generator online tool can be used to create a custom assessment.
    - The *Assessment Guide - Grade 5 Teacher Edition* offers a range of tools for evaluation and questioning, including multiple-choice and open-ended questions and performance tasks.
    - The Graded Assessment Database offers three levels, Below, At, and Above, to support teacher analysis of data.
    - The Assessment Matrix lists the knowledge statements for core concepts to support tracking overall data for students.
- In the *Teacher Program Guide - Grades K-8 Science*, the information provided states, "Level 1 learners will require more time and content from STEM and art projects in conjunction with story books." Level 2 students must follow the original scope and sequence and work on

additional projects at home. Level 3 students continue the scope and sequence and can complete the advanced learner content and advanced STEM projects. Benchmark tests determine levels.

- The information gathered from the assessment tools helps teachers plan differentiated instruction. For example, the Learn By Doing Assessment Matrix categorizes students into three proficiencies: Some Proficiency, Approaching Mastery, and Mastered. Also, teachers can use Benchmark and other assessment data to assign below-grade level students Level 1 questions from the Assessment Generator, locating appropriate questions by TEKS, as stated in the *Program Guide*.

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

- Materials provide a variety of resources but lack teacher guidance on how to leverage different activities to respond to student data. Examples of resources included in program components that teachers can leverage in responding to student data include the *Learn By Doing STEAM Activity Reader Book*, the *Student Textbook - Grade 5 Science*, the *Student Journal - Grade 5 Science*, the *STEAM Activity Guide*, the *Assessment Guide - Grade 5 Student Edition*, and the Intervention Focus Tutorial.
- The *Teacher Program Guide - Grades K-8 Science* offers general guidance for using different activities to respond to student data. “Level 1 learners will require more time and content from STEM and art projects in conjunction with story books.” Level 2 students must follow the original scope and sequence and work on additional projects at home. Level 3 students continue the scope and sequence and can complete the advanced learner content and advanced STEM projects. Additional guidance in this resource directs teachers to “grade and insert results” for “Focus Questions” and “Performance Tasks” onto the report card.
- The *Assessment Guide - Grade 5 Teacher Edition* offers review activities, performance tasks, and reteach assessments to assist teachers with direct instruction for using interventions. For example, the materials state, “[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, materials categorize performance levels as Some Proficiency, Approaching Mastery, and Mastered. The *Teacher Program Guide* provides limited guidance on students who are considered Level 1, stating: “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.
- 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.

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December 2023

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Indicator 6.3

Assessments are clear and easy to understand.

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

Partial Meets Score 1/2

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

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

Evidence includes but is not limited to:

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

- Assessments for the grade level contain items that are scientifically accurate, avoid bias, and are free from errors. Materials accurately and correctly present content and concepts for the grade level. Formative and summative assessments include items that present content and examples fairly and impartially with no impact on student performance based on such factors as a student's home language, place of origin, gender, or race and ethnicity. This is evident in the Assessment Generator, which provides TEKS-aligned assessments, and the range of assessments in the *STEAM Activity Guide - Grade 5 Teacher Edition.*
- In the *Assessment Guide - Grade 5 Teacher Edition** on page 102 Science Assessment Questions there are 4 assessments that address physical properties. The questions are appropriate and well designed. The teacher is provided with scientifically accurate answers.

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 STEAM Activity Reader Book*, 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 STEAM Activity Reader Book*, 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.
- 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 guidance to ensure consistent and accurate administration of the various assessment tools included in program components. The Progress Monitoring section of the *Teacher Program Guide - Grades K-8 Science* provides guidance on when to administer certain assessment tools. The product has four benchmark tests and guidance for when to give each benchmark. For example, "Benchmark 1 test - to assess natural knowledge at the commencement of term before any program content being taught." Materials guide the teacher on when to administer benchmarks 2-4 throughout the year.
- Materials provide guidance for the administering items in the Assessment Database tool. The Assessment Database entry screen provides options for teachers to select TEKS-aligned questions, choose the level of questions, and show the answers. For example, item #122 asks students to work alone, and #125 tells students to work with a partner. The Assessment Database 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 *Teacher Program Guide - Grades K-8 Science* provides information on administering and scoring questions from the Assessment Generator. After completing activities in each chapter of the *Learn By Doing Activity Reader Book - Grade 5 Teacher Edition*, materials state that "teachers will assess students using Level 1 and 2 questions from the Online Library - Assessment generator or Online Library - Interactive software tool….These results should be added to the assessment matrix."
- The *Teacher Textbook - Grade 5 Science* provides guidance for administering visual assessments. Materials state, "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."

TPS STEAM into Science Grade 5

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

- Materials lack guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned to learning goals. For example, materials lack suggestions for time, scheduling, or setting accommodations that would allow students of varied needs and abilities to demonstrate grade-level mastery.
- Materials offer a wide range of assessments, allowing students to demonstrate mastery of knowledge and skills aligned to learning goals in various ways, including open-ended responses, projects, performance tasks, and multiple-choice questions. However, materials lack guidance for accommodating students with linguistic, neurodivergent, or other needs on assessments throughout the program.
    - For example, the *Teacher Textbook - Grade 5 Science* 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.
    - 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 that teachers “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 include a means to differentiate assessments according to ability level in the Assessment Generator and provide guidance for using the leveled questions feature in the *Teacher Program Guide - Grades K-8 Science*. This tool allows teachers to select items above or below grade level that align with the standard. While this tool offers a differentiated assessment option that changes the expectation for students to demonstrate mastery, it does not give guidance to offer accommodations on assessment tools included in the program.
- The *Assessment Guide - Grade 5 Teacher Edition* 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.
- The TPS Interactive Assessment Software Tool allows teachers to create and modify questions within the data bank to support differentiated instruction. Teachers can simplify language, as appropriate, and include exemplars for open-ended questions to help identify students needing additional support.

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.	M
2	Materials provide enrichment activities for all levels of learners.	M
3	Materials provide scaffolds and guidance for just-in-time learning acceleration for all students.	M

Meets | Score 2/2

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

Materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved grade-level mastery. Materials offer enrichment activities for all levels of learners. Materials provide scaffolds and guidance for just-in-time learning acceleration for all students.

Evidence includes but is not limited to:

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

- Materials give an overview of recommended targeted instruction and activities to scaffold learning for students who have not yet achieved grade-level mastery in the Support Notes for Teachers section of the *Teacher Program Guide - Grades K-8 Science.* Materials state: “TPS has provided supplements that can be used for after school, reteaching, or additional homework.” The document notes the inclusion of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* RTI Scope and Sequence, which provides an alternate pacing plan for each grade level. It also states that STEAM activities “act as reteach tools for students who did not master the content with the first two components,” instruction provided through the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* and textbook lessons for the grade level.
- The Support Notes for Teachers also recommend using the Online Library - Assessment Tools with “students who remain below grade level” or a “student who responds incorrectly.” In these situations, teachers can “choose Level 1 assessment questions for the TEKS being taught…and discuss answer given with student. Determine if there is a misconception and resolve.” The guidance emphasizes the role of science language in causing student misconceptions and recommends that teachers use the science glossary cards provided in the Online Library to review word meanings and use them with students.
- When students struggle with grade-level concepts, materials recommend using the Intervention Focus Tutorial for current and previous grade-level TEKS. Materials state: “Teachers can use more or less of the leveled materials to suit the individual student’s progression. For example, if students are working below or far below grade level due to reading, teachers can use the intervention focus tutorial and choose the grade and appropriate TEKS content that should have been mastered in an earlier grade but was not.”

- Materials include teacher guidance for scaffolding instruction during lessons under the Support headers in the *Teacher Textbook - Grade 5 Science*. This guidance is sometimes generalized for all students and not specific to students with learning gaps. For example, in the Light lesson, materials state: "Students may need further direction to help them understand what each part of the investigation shows." The Support headers also include general reminders to provide many hands-on investigation opportunities to support students with grade-level mastery.
- Materials also include a Scaffolding section for each lesson in the *Teacher Textbook - Grade 5 Science*, which lists previous and future TEKS to support students with gaps in grade-level knowledge, and a Support Matrix Document listing resources that align with each standard. In the Learn by Doing Scope & Sequence, RTI materials provide recommended targeted instruction and activities for each lesson from the STEAM storybooks.

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*. Materials prompt students to develop a pictogram displaying data collected from measuring family properties. The *STEAM Activity Guide - Grade 5 Student Edition* 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 Mystery Matter Game chapter 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 Reader Book - Grade 5 Student Edition* 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 Book - Grade 5 Teacher Edition* 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?"

TPS STEAM into Science Grade 5

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

- The materials provide scaffolds and guidance for just-in-time learning acceleration in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition.* Each chapter contains several Idea Boxes within the text, giving the teacher prompts and cues to support student understanding. For example, Idea Box 1 in Chapter 5, The Mystery Matter Game, 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. Additionally, 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. Throughout the chapters, these supports serve various instructional purposes outside of just-in-time learning acceleration, including supporting student engagement, helping teachers deliver instructions, and demonstrating scientific concepts.
- The materials contain teacher guidance regarding strategically targeting learning gaps during first instruction. For example, the materials offer a variety of support materials that can be utilized for varied learner needs, such as picture vocabulary cards and a simplified textbook found in the online resources.
- Just in time content is provided and detailed in the teacher program guide K-8 which advises the online materials available. In the Teacher Program Guide K- 8, under the Support Notes For Teachers, bullet three discusses how the goal of the program is for students to master all TEKS. If students are having a difficult time with concepts, it gives teachers guidance on how to address the students' needs. If students master the TEKS, guidance is also given on how to allow the student to progress and what level of questions to give the student on assessments.

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

Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content. Materials consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one). Materials support 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 mastery of the content. For example, the chapter on Earth and Space contains a lesson beginning with students working in groups of three 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 Properties portion incorporates various developmentally appropriate approach concepts. For example, the section includes grade-appropriate text with identified terminology, reflection questions, and guided inquiry.
- Activity 2, Decomposers, in Chapter 1 of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition,* 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 grade 5 lesson on ecosystems in the *Teacher Textbook - Grade 5 Science* 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."
- In the *Teacher Textbook - Grade 5 Science,* in the 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 implementing multiple types of practices. For example, the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* 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 - Grade 5 Teacher Edition*, 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 - Grade 5 Science* are provided to the whole group, while investigations sometimes provide suggestions for pairs or small groups. For example, the Preparation section of the Water Cycle Model investigation prompts teachers to "divide students into pairs or small groups."
- 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 four multiple-choice questions, and the Literacy Challenge asks students how 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 support multiple types of practices (e.g., modeled, guided, collaborative, independent) but provides limited guidance and structures to achieve effective implementation for all TEKS. In the *Teacher Program Guide - Grades K-8 Science,* Support Notes for Teachers provide some detail on how the program starts with the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition*, 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 - Grade 5 Teacher Edition* 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 on how to implement these structures effectively in a science classroom.
- The materials provide some teacher guidance for implementing multiple types of practices. For example, the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* 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 *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* intentionally includes illustrations of physically diverse students. The *STEAM Activity Guide - Grade 5 Student Edition* does not reference characters or students often. The examples reflect lighter-skinned illustrations. Illustrates and characters’ names reflect the intentional incorporation of diverse community members. For example, the illustrations of the characters in Chapter 8 reflect a variety of genders, skin tones, and hairstyles.
- Materials represent diverse communities using information that is respectful and inclusive. For example, the information in The Science section of the Environmental Changes lesson 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 *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition*, 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 represents 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.	M

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.

Materials include some guidance for linguistic accommodations (communicated, sequenced, and scaffolded) not commensurate with various English language proficiency levels as defined by the ELPS. Materials encourage strategic use of students' first language for linguistic, affective, cognitive, and academic development in English.

Evidence includes but is not limited to:

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

- Materials list the ELPS in the *Teacher Program Guide - Grades K-8 Science* and note that the content of program components is intended to align with both TEKS and ELPS for each grade level. The Program Components section lists ELL supports as a feature of each lesson in the *Teacher Textbook* and provides examples of excerpts from grade-level lessons. These excerpts indicate that the generic guidance to support ELL students within lessons does not correspond to language domains or proficiency levels. This overview document lacks further information on guidance for linguistic accommodations commensurate with various levels of English language proficiency as defined by the ELPS.
- Materials include guidance for linguistic accommodations under the ELL (English Language Learner) header at the end of each lesson in the *Teacher Textbook - Grade 5 Science.* For example, in the Grade 5 lesson, Tools, the materials list the following suggestions under the ELL header: "Ensure students understand the adjectives you are using to describe tools. Have students think about the words they can use to describe the different tools. Encourage students to think about prior experiences they have had in which they have thought about and discussed tools." Other lessons in the *Teacher Textbook* offer similar suggestions as ELL accommodations. The Grade 5 lesson, Properties, advises teachers: "As students conduct their investigation, tour the classroom, ensuring that ELL students are taking a full part in the discussion. Ask questions to gauge their understanding. Monitor student spoken language and encourage them to self correct if necessary." The Patterns of Motion lesson advises, "Provide students with pictures or diagrams representing changes in position over time. Have students describe what is occurring

in the pictures. Ensure students are able to use appropriate vocabulary." While these suggestions guide teachers toward supporting emergent bilingual students, the guidance is not consistently in line with providing linguistic accommodations and is not commensurate with various levels of English language proficiency as defined by the ELPS.

- Materials embed the ELPS as learning targets at the beginning of each "Amelia Rose Explores" section in the *STEAM Activity Guide - Grade 5 Teacher Edition*. For example, at the beginning of "Amelia Rose Explores Matter and Energy," materials provide a table with several "cross-curricular second language acquisition/learning strategies," including the following: "Use prior knowledge and experiences to understand meanings in English; Use prior knowledge to understand meanings in English; Use prior experiences to understand meanings in English." Beyond the table listing learning targets at the beginning of these sections, this program component lacks guidance for providing linguistic accommodations within teacher guidance for using activities, science vocabulary, and narrative text.

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

- Throughout the program components, materials encourage use of students' first language and use it as a means to linguistic, affective, cognitive, and academic development in English. Materials primarily offer guidance on native language use through flashcards and translations, as well as some oral responses and discussions.
- Materials encourage the use of students' first language in suggestions under the ELL headers in the *Teacher Textbook - Grade 5 Science.* These suggestions pertain to using Spanish glossary cards included in the program components and making flashcards in languages other than English. For example, ELL header guidance in two lessons, Tools and Investigation: Name the Scientist, states: "Use the Spanish glossary cards to assist relevant students. "The Spanish glossary cards are available to teachers in the Online Library - Blackline Master - K-8 Science.
- Materials encourage the use of students' first language in a suggestion under the Tips for ELL Students header in the *STEAM Arts Project Guide K-12* Grade 5. For example, the Teacher Text states, "If possible, have students work in collaborative groups where students share the same languages, and ideally, one student is advanced in English. Use visual and tactile models to illustrate elements of each activity and focus on the keywords. You can have students create a journal of words in their first language and in English."

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.	M
3	Materials include information to guide teacher communications with caregivers.	M

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials 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 information to guide teacher communications with caregivers.

Evidence includes but is not limited to:

Materials provide information to be shared with students and caregivers about the design of the program.

- The materials provide the *Family/Caregiver Guide - Grades K-8 Science*, which introduces the philosophy, research-based strategies, program components, assessment information, and a glossary for each grade. Within this resource, the Program Introduction explains the research behind the program content and describes the program's philosophy in easy-to-understand language for students and caregivers. This resource also includes an overview of the components and the sequence of materials intended to be used during instruction. It is available in a digital format for sharing with parents and caregivers.
- Materials include an overview of the *Family/Caregiver Guide - Grades K-8 Science* within the *Teacher Textbook - Grade 5 Science*. This information provides teacher guidance on sharing information about the curriculum with families and caregivers.
- The *Family/Caregiver Guide - Grades K-8 Science* details elements of the program and the purpose behind its design. One element described is practical approaches to teaching and learning science and the benefits of understanding how to "confront scientific arguments, advances, and associated technologies in their daily lives." The materials list everyday science applications that will support students as they grow. The guide continues to address TPS's pedagogical approach, "[using] storytelling as its main strategy," including a reference to research that says, "Students learn best when they enjoy the way a lesson is presented."
- Further, the *Family/Caregiver Guide - Grades K-8 Science* describes research-based strategies considered as TPS developed the program. The materials cite evidence such as "Social lessons improve student learning." and "Students learn in different ways, so the content must be presented that attaches the visual kinesthetic and auditory senses." The research references assist families with understanding the design of the program.

- Additionally, the *Family/Caregiver Guide - Grades K-8 Science* includes links to online materials, and the section included in the *Teacher Textbook - Grade 5 Science* has a guide with the following sections: Program Introduction, Program Components, TEKS, ELPS, Explanation of TEA/SBOE process and [program] approach, Texas Resource Review requirements, Navigation Guide - Online Resource, Information about [program], Progress Monitoring, Family Visits and Teaching Pedagogy - Storytelling and STEAM.

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

- Materials include the *Family/Caregiver Guide - Grades K-8 Science*, a resource designed to facilitate family support for learning. This document references the free digital access that materials provide for families to reinforce student learning.
- The *Family/Caregiver Guide - Grades K-8 Science* provides resources and strategies for caregivers to help reinforce student learning and development, stating that “Parents/caregivers can help enforce some of the requirements of the TEKS at home. The work you can complete with your children will vary between assisting students studying new TEKS content and explaining how it applies to home life and practical assistance with safety measures.” It further 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 *Teacher Textbook - Grade 5 Science* lessons include an At Home section with specific suggestions for home reinforcement. For example, this section in the Unit 4 lesson, The Water Cycle, offers the following information to be shared with caregivers: “Complete the literacy and math challenges as homework.” The Support section provides additional information for caregivers, stating that “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.”
- 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.”
- Materials mention in the *Teacher Textbook - Grade 5 Science* that teachers can share resources like the glossaries included in the program with families, as these are available digitally. Here, materials also reference other resources that can be shared, such as at-home activities in the *Student Textbook - Grade 5 Science*.
- The materials provide information for parents and caregivers about ways they can reinforce learning and development. For example, the materials include a document titled How Teachers and Caregivers are Supported by STEAM Content, which provides introductory information for caregivers and concrete ways caregivers can support learning at home. For example, it provides the strategy, “Ask the students to define specific words and demonstrate them with an action or an example in a sentence.”

Materials include information to guide teacher communications with caregivers.

- Materials provide the Science Report Card as a teacher resource. This resource includes the following guidance for teacher communications with caregivers: “Please fill in the parent

comment section so that we can work together to monitor your child's progress." The Science Report Card contains rows and columns for teachers to communicate student progress toward mastery of science and literacy standards according to four levels: Novice, Intermediate, Expert, and Not Yet Introduced.

- Materials include teacher guidance for communicating with caregivers in the *Family/Caregiver Guide - Grades K-8 Science*. This guidance includes advice for building relationships and sharing digital resources. For example, materials advise teachers to "provide digital access to caregivers at the start of each term" and suggest that teachers "hold a tutorial meeting in which the teacher can step the caregivers through the program, the digital tools, and the access they will receive to use at home."
- The *Teacher Program Guide - Grades K-8 Science* offers additional information to guide teacher communication with caregivers, including suggestions for holding regular meetings and emphasis on the importance of actively working with caregivers. This guidance document states that "teachers may wish to ask various caregivers to come into the classroom to discuss how their job roles utilize various STEAM approaches" and affirms that doing so "will also enable caregivers to communicate with the students and feel valued within their child's education." It also guides teachers to "acknowledge and show gratitude for the time caregivers give to help the students."

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

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include year-long plans with practice and review opportunities that support instruction.

Materials are accompanied by a TEKS-aligned Scope and Sequence outlining the order in which knowledge and skills are taught and built into the course materials. Materials provide clear teacher guidance for facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts. Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.

Evidence includes, but is not limited to:

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

- The *Teacher Textbook - Grade 5 Science* contains a Scope and Sequence outlining the TEKS aligned with each unit. This resource outlines the unit, TEKS, textbook reference page, and the number of class periods and revisions needed for each unit. The materials also include TEKS-aligned vertical alignment for grade 5 at the beginning of every chapter in the *Teacher Textbook.*
- Additionally, the TEKS 1–5 Content Guide outlines which SEPs are aligned to lesson components.
- 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.

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

- The materials provide year-long tools that indicate where teachers may find opportunities for facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts. For example, the materials provide a grade-level scope and sequence document outlining the instances where core concepts, SEPs, and RTS are present

throughout program components. Additionally, the *Learn by Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* contains an Appendix and Essential Content Guide, both outlining chapter contents and connections to science TEKS. The Appendix shows the science concepts covered in each chapter, and the Essential Content Guide shows which chapters align with a given science TEKS.

- The Science is a Verb category in the *Teacher Textbook - Grade 5 Science* includes a Teacher Guided Questions to Inquiry section for each lesson. For example, materials provide five questions for the lesson What are the Properties of Water? Some questions include: "What are a variety of uses of water?: and "What happens when ice is put into water?" These questions provide opportunities for facilitating student-made connections within a lesson. For each set of questions there is guidance in the Additional Hints section.
- Teacher guidance in the *Learn by Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* provides support for facilitating student-made connections across scientific and engineering practices and recurring themes and concepts. Under the heading "Systems," teacher guidance helps facilitate student-made connections to cause and effect: "Systems also provide an opportunity to review cause and effect, for example, with a car which is a sum of its parts. If one of its parts is defective, then this will impact the car's functioning."

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. The Horizontal alignment chart shows teachers how knowledge and skills spiral throughout the year. Teachers can also view spiraling from other grades using the vertical alignment chart.
- Materials provide suggestions for knowledge and skills spiraled through different activities. For example, the *Teacher Textbook - Grade 5 Science* 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. 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.
- Materials provide suggestions for knowledge and skills spiraled through different activities. For example, the *Teacher Textbook - Grade 5 Science* 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. 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.
- Materials include project-based lessons incorporating multiple standards within an investigation, including some previously taught.

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 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 using the materials. The textbook component includes expository text aligned to grade 5 TEKS. It also includes research-based instructional strategies such as cues, questions, and advance organizers, generating and testing hypotheses, and scaffolding instruction used in inquiry-based investigations called Science Is a Verb. The *Teacher Textbook* also includes a project-based lesson that supports 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 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. Idea Box 1 provides prompts to help students connect the word "population" to their experiences. Idea Box 2 suggests teachers create a concept map with students to understand a niche.

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

- Materials include a grade-level scope and sequence at the beginning of the *Teacher Textbook - Grade 5 Science.* This resource shows the science TEKS correlated with each unit in the textbook and the corresponding page numbers to reference the TEKS in other program components, such as the *Learn by Doing Reader Book*.
- Materials provide standards correlations that explain the standards within the context of the grade level through scaffolding information in the *Teacher Textbook - Grade 5 Science.* At the beginning of each traditional textbook lesson, materials showcase what students should already know from previous grades and will learn in future grades, K-5, below the objective students will learn through the lesson, with TEKS correlations.
- The Appendix of the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* lists chapters within the program and correlating standards, including science and cross-content standards for Math and ELA. This chart includes the language of the standards for student skills but does not include the TEKS. The Essential Content Guide embedded after the Appendix in the *Learn by Doing STEAM Activity Reader Book - Grade 5* includes science standards correlations by chapter. Materials also include the vertical and horizontal alignment of the *Learn by Doing STEAM Activity Reader Book* in the *Teacher Program Guide - Grades K-8 Science*.

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 *STEAM Activity Guide Grade 5 Teacher Edition* lists materials needed for each lesson portion. For example, materials include a list of supplies students must use to conduct an investigation testing magnetism.
- Teachers can view a list of materials needed for specific lessons in the *Teacher Textbook* in the different investigations. The materials detail supplies for use in hands-on exploration in grade 5. For example, Activity 4, "Speed and Velocity," lists metric rulers, meter sticks, magnets, and other materials to support students as they investigate forces. In another lesson, Activity 2 lists moistened soil samples, sealable bags, and microscopes to support students as they investigate soil. The materials list supplies needed to build circuits, such as LED lights, wires, electrical tape, 3V coin batteries, and wire strippers. The resources list physical materials to support the lesson, such as in Activity 4, "Light Transmission." The materials advise gathering wood, metal, paper, wax paper, and others for the lesson.
- Materials provide a STEAM into Science Grade 5 Textbook Kitting List, which alphabetically lists all required materials to complete activities and investigations.

TPS STEAM into Science Grade 5

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

- The materials provide teacher guidance for safety practices during the "Working Safely and Responsibly" lesson in the *STEAM Activity Guide Grade 5 Teacher Edition*. The lesson provides opportunities for teachers to explain the importance of safety equipment, such as safety goggles and expectations for safety during an investigation.
- Materials provide 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 occur at the start of the program of study so students can practice these ideas throughout the remainder of the year.
- The materials include a section called "Safety in the Classroom" to refer teachers to the Texas Education Agency-approved safety standards. The resources highlight the need for safety equipment, specifically splash-proof goggles and gloves. The materials provide safety recommendations to eliminate potential student exposure to mold while investigating decomposition. The instructional materials include a section called Idea Box, which provides recommendations for implementing the lesson. The final part of the box reminds students to use care when using lasers.
- Materials include guidance for safety practices during investigations. For example, the materials provide safety practices during the "Working Safely and Responsibly" lesson of the *STEAM Activity Guide Grade 5 Teacher Edition*, completed at the beginning of the year. The lesson provides opportunities for teachers to explain the importance of safety equipment, such as safety goggles and expectations for safety during an investigation. Materials provide teacher guidance for safety practices in the *Teacher Textbook*. For example, the science background information provides teacher guidance on the importance of safety when using certain science tools during an investigation.

TPS STEAM into Science Grade 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 Scope and Sequence document includes a column with the number of 50-minute class periods needed for instruction and compares the days required to the total instructional days in the year. For example, Unit 3 will cover 34 of a 150-day calendar. The Pacing Plan/Year Planner includes a visual reference of the unit and lesson duration in a month-to-month view. Using the Pacing Plan, teachers can see Unit 2 covers most of September and part of October of the coming year. The Lesson Plan includes a section called Time Required to support planning. For example, in the Properties lesson, textbook work will take 30 minutes, and the Potato Jacket Investigation will take 50 minutes. The materials indicate that the 50 minutes allotted for the investigation span several hours.
- The materials include support for scheduling considerations with the days provided for unit instruction. The grade 5 Scope and Sequence in the *Teacher Textbook - Grade 5 Science* includes guidance and recommendations for the required time for class periods at 50 minutes each. In addition, the Online Pacing/Year Plan includes a sample calendar to identify the number of instructional days needed for each unit. This pacing calendar also includes class days designated for revision, assessment, and reteaching. The materials include guidance on scheduling considerations for covering required science content for grade 5. For example, the *Teacher Textbook - Grade 5 Science* includes the time required for a lesson on designing an investigation that tests the effects of force as needed: 90 minutes, or two 50-minute class periods. The materials include guidance on scheduling considerations for covering required science content for grade 5. For example, the *Assessment Guide - Grade 5 Teacher Edition* includes the overall time required for a lesson on using science tools during investigations as needing 100 minutes or 2 class periods. In addition, a more broken-down recommendation for different components

within the lesson is provided, including the introduction needing 30 minutes, textbook work needing 25 minutes, 30 minutes for hands-on investigation, and 15 minutes for lesson summary.

- Materials in the *Assessment Guide - Grade 5 Teacher Edition* provide lesson plans with listed time requirements for each lesson segment. For example, introduction (15 minutes), textbook work (15 minutes), etc. The Pacing Calendar in the materials from the *Teacher Textbook - Grade 5 Science* support for scheduling considerations, listing the number of days needed to complete each unit.

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

- The materials include a section called Activities and Pacing that describes the components of each chapter. Materials recommend at least 50% of instructional minutes be integrated with Scientific and Engineering Practices (SEPs). The Appendix in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Teacher Edition* 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.
- The grade 5 materials provide guidance for the implementation of the recommended sequence content that is consistent with the developmental progression of science. The Scope and Sequence found in the *Teacher Textbook - Grade 5 Science* provides a suggested sequence of units that follows the sequence of reporting categories outlined in the knowledge and skills (TEKS) for Grade 5 science. For example, the grade 5 lesson, Properties, in the *Teacher Textbook - Grade 5 Science* builds on earlier learning about different properties to make comparisons. Materials in the *Assessment Guide - Grade 5 Teacher Edition* also provide guidance about the sequence of content. For example, students respond to open-ended questions about energy transformations after instruction has occurred.
- The Pacing Calendar in the materials from the *Teacher Textbook - Grade 5 Science* 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 schedule visually showing how the course fits within a single school year. The *STEAM Activity Guide - Grade 5 Teacher Edition* provides a day-by-day description of each activity. The breakdown informs teachers' decisions to prioritize lesson components or adjust due to time constraints. Grade 5 teachers can quickly distinguish between instructional days addressing foundational concepts such as erosion and deposition and those addressing additional examples. The *STEAM Activity Guide - Grade 5 Student Edition* 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 in the *Teacher Textbook - Grade 5 Science* 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 eight 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 supports and 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 student learning. While some student-facing program components in the materials do include an appropriate amount of white space and a design that supports student learning, the core components do not.
    - For example, the *Student Textbook - Grade 5 Science* is text-heavy, lacking adequate white space and other design features to support student learning. Lessons in the textbook often contain one to two pages of closely spaced text without graphic or text features. Chapters and lessons within the textbook lack clear titles that would help students navigate the various topics, activities, and sections.
    - For example, the traditional lesson, Name the Scientist, in the *Student Textbook - Grade 5 Science* begins with two single-spaced pages of background information under the heading The Science.
    - For example, the traditional lesson, Modeling systems: Scale, proportion, and quantity, includes an investigation presented in paragraphs with no text or graphic features to support student understanding. The following section, What Have You Learned? appears to be intended as a summary of key points for students but lacks formatting, text, and graphic features to grab student attention. Both pages present ample white space following the text.
    - For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition,* some text in Chapter 3, The Sun, Moon, and Oceans, appears in red, blue, and green, in contrast with the rest of the story in black. The lack of consistency distracts the reader from pulling information from the text.

- For example, each chapter in the *Learn By Doing STEAM Activity Reader Book - Grade 5 Student Edition* has bolded keywords that stand out so that students know the term is important. Activities have space for students to write their responses to questions and graph their responses if needed.
- For example, the Student Journal provides students with white space to respond to fill-in-the-blank questions and space to create projects based on the questions.

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

- The materials do not embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. Materials frequently use unrealistic clipart, rather than realistic pictures and graphics, when presenting science content and concepts and embed fun and decorative pictures and graphics that are visually distracting to students. Materials also embed pictures and graphics that detract from learning by presenting distorted images or models of scientific content.
    - For example, in Chapter 2 of the *Learn by Doing STEAM Activity Reader Book - Grade 5 Student Edition,* the materials present a photograph of a cheetah, an image of a Speed Limit 65 sign, an image of a flower, an image of a hummingbird, and a clipart image of a baby crying.
    - For example, in the *Student Textbook - Grade 5 Science*, most photographs and clipart lack captions explaining the images and how they relate to the text, thereby lacking support for student learning and engagement.
    - For example, a Project Based Lesson in the *Student Textbook - Grade 5 Science* includes a clipart image of a female construction worker grabbing a pulley. The text on the page, titled The Science, explains the concept of energy transfer.

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 - Grade 5 Science*, Properties lesson, student lab handout materials are free of wrong answer sheets to problems.
    - For example, the *STEAM Activity Guide - Grade 3 Teacher Edition* 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.	Yes
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

Materials are somewhat intentionally designed to engage and support student learning by integrating digital technology.

Materials 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.

- The materials integrate technology and tools that support student learning and engagement. Materials include digital access to components, online assessments, tutorials, and digital technology.
    - For example, the Interactive Assessment Tool allows students to complete tests and quizzes online.
    - For example, the Intervention Focus Tutorial provides digital access to below-level, at-level, and above-level science TEKS for students needing differentiated instruction.
    - For example, the *Teacher Program Guide - Grades K-8 Science* outlines the digital components of the instructional materials and gives an overview of materials that can be accessed digitally.
    - For example, the Online Library includes NEST family videos and workbooks.
    - For example, materials include access to the TPS Alaska Library, which provides a coloring book and audio clips.
    - For example, the online platform contains digital versions of Reader Activity Books and digital photographs of tools.

- For example, Chapter 4 in the *STEAM Activity Guide - Grade 5 Teacher Edition* directs teachers to allow students access to their school's internet and books to research a dinosaur with teacher guidance.

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. While materials refer to online resources in lessons and activities and provide online assessments, the program lacks such digital technology components as demonstration videos or interactive labs that would support student engagement with the SEPs, RTCs, and grade-level content.

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

- The materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. The materials indicate all online resources are separate links and not interconnected, thus preventing digital collaboration among students and teachers.
- 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.
- The materials do not recommend platforms, links, or resources on how those digital suggestions can be accessible to students and teachers.
- The materials do not provide suggestions or resources for collaboration between teachers and students.
- The Intervention Focus Tutorial can be shared between teacher and student to support student learning but does not allow teachers and/or students to collaborate.

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

- The materials do not integrate digital technology that is compatible with a variety of learning management systems, but do note that all digital materials are accessible via any computer or mobile device with the internet. The materials recommend internet use for many research-focused activities in student-facing materials.
- The *Teacher Program Guide - K-8 Science* states that digital technology within the materials is compatible with Clever but does not mention other learning management systems.

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.	Yes

Not Scored

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

Digital technology and online components are not developmentally appropriate for the grade level and do not 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 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 included in the materials comprise print-based content and resource materials in the Online Libraries and guidance to use the internet for web-based research and resources in student activities. Materials include the following in the Online Libraries: Assessment Tools, Reader Activity Books, Student Reasoning Library, Blackline Master Library, STEAM Library, and the Digital Frog Library. These resources and tools are consistent across the K-8 program and not specific to the grade level.
- The materials lack digital technology and online components outside of the digitized files of print materials. The online materials consist mostly of print-based materials being placed in an online viewer or images being available for display.

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

- The materials do not provide teacher guidance for the use of embedded technology to support and enhance student learning.
    - For example, the materials lack teacher guidance for the use of embedded technology in the *STEAM Activity Guide*. Materials state, "Please refer to your school's computer safety policy for work that involves students using computers and the Internet."

- For example, materials provide a Crosscutting Library of photographs but lack teacher guidance for embedding these photographs within lessons and activities to enhance student learning.
- For example, while materials provide a video guiding teachers on using the interactive software tool and the assessment generator, this guidance is lacking for other components, such as the intervention focus tutorial. Materials do not include step-by-step instructions for setting up and using technology. Materials do not provide troubleshooting tips for common problems teachers may encounter.

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

- Materials are available to parents and caregivers to support student engagement in online components.
    - For example, the *Family/Caregiver Guide - Grades K-8 Science* that teachers and caregivers should communicate so that digital access to the curriculum is provided for the student at home. Materials provide caregivers with access to online resources, including but not limited to homework, TEKS and ELPS correlations, glossary cards, and digital textbooks. This document allows parents and caregivers to support student engagement with online tools like the Intervention Focus Tutorial.
    - For example, materials provide an e-letter that provides online access to materials, resources, and activities to reinforce student learning and development.
    - For example, materials provide access to NEST family videos to support learning at home but lack guidance to support student engagement with this online component.
    - For example, materials provide parents and caregivers access to digital versions of all Reader Activity Books.