

# TPS STEAM into Science Grade 4

## TPS STEAM into Science Grade 4 Executive Summary

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

Grade	TEKS Student %	TEKS Teacher %	ELPS Student %	ELPS Teacher %
Grade 3	100%	100%	100%	100%
Grade 4	100%	100%	100%	100%
Grade 5	100%	100%	100%	100%

### Section 2. Instructional Anchor

- The materials are 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.

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- 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.

- The materials in the *Teacher Textbook - Grade 4 Science* include opportunities to support students as they develop practices within engineering design. One introductory example uses a project-based learning format to establish a foundation of solution-based thinking. Students demonstrate mastery of scientific and engineering practices (SEPs) by conducting an investigation, gathering and analyzing data, and identifying the advantages and limitations of models. Furthermore, students anchor their understanding on one of the Recurring Themes and Concepts: scale, proportion, and quantity. The *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* Introduction includes a section titled Scientific Method, where the materials provide a linear diagram depicting steps in the process. The subsequent text offers

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guidance for teachers to further explain each step in the diagram. Portions of this explanation address SEPs and ask students to pose questions and conduct investigations.

- Grade 4 students investigate and explain how most producers can make their own food using sunlight, water, and carbon dioxide through the cycling of matter. Students use the Scientific Method to conduct a descriptive investigation and analyze and interpret data to derive meaning as outlined in the TEKS. The materials outline the use of engineering practices to investigate fourth grade-appropriate content concepts. Students engage in phenomena of how engineering solutions have changed our lives. Students identify a problem in their lives and work through the engineering process to identify a possible solution to test out.
- The Classification lesson in the *Teacher Textbook - Grade 4 Science* provides opportunities for students to use the scientific and engineering practices learned previously to design, conduct, and plan a series of experiments using tools to classify objects based on their physical properties. Materials in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition* provide opportunities for students to hypothesize, design, plan, organize, and conduct experiments using SEPs. In this portion of the materials, students use the scientific method to describe the physical properties of everyday items.

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, in Chapter 6 of the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* provides narrative information about how factors such as temperature impact change in materials, like cracks in concrete due to water freezing and expanding. However, there is no connection made between this and other concepts, such as how factors affected change in past environments (TEKS 4.12C).
- Materials include some opportunities for students to make connections within overarching concepts using the recurring themes. Some of the *Teacher Textbook - Grade 4 Teacher Edition* lessons provide connections to the recurring themes within concepts. However, in lessons 8C - SIAV and 8C TRAD regarding the flow of electricity and electricity, respectively, there are no connections made to circuits as systems or connections to other systems in other scientific concepts.
- The materials provide some connections between and within overarching concepts through the narrative texts in the *Learn By Doing STEAM Activity Reader Book - Grade 4 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.

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 4 Teacher Edition* contains idea boxes that explain, describe, and make connections to develop conceptual understanding. The materials systematically develop students' content knowledge and skills

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appropriate for the concept. For example, the grade 4 lesson on ecosystems begins with students building a food chain, which builds on student learning from grade 3, then a food web to explore the relationships in an ecosystem.

- In grade 4, a lesson sequence within the Matter and Energy unit requires students to compare and contrast a variety of mixtures and solutions, building on previous learning about the creation of mixtures using two or more substances in grade 3. Materials provide guidance for teachers to elicit students' previous learning experiences. Materials in the *Teacher Textbook - Grade 4 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.
- In Science is a Verb, the materials provide a correlation breaking down the chapter content according to the Recurring Themes and Concepts (RTC) supported. The materials offer similar correlations throughout other activities, including a Project-Based Lesson addressing the properties of matter and conservation of matter in mixtures. The materials arrange concepts to explore systems such as the water cycle and the impact of water on the environment. The content begins with everyday observations and continues to determine the cause of the phenomena. The materials encourage students to further their thinking by considering the role of water on the land and weather. The publisher arranges chapters to connect content with previous content. For example, the study of the water cycle on land transitions into content regarding air systems in weather.

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 4 materials provide opportunities for students to engage in problem-solving to make connections across disciplines to develop an understanding of science concepts. Students make connections between science and literacy in activities focused on comprehension of a text, researching plant adaptations, and understanding vocabulary words and terms. Students make connections between science and math in an activity focused on solving one and two-step problems involving basic operations. The materials include opportunities for students to make connections across disciplines and develop an understanding of science concepts. Students connect science and literacy when responding to open-ended questions after a class investigation.
- The *Teacher Textbook - Grade 4 Science* provides sufficient opportunities for students to ask questions and plan and conduct investigations. For example, the Let's Get Popping lesson provides guiding questions the teacher can ask to help students investigate the physical changes of popcorn before and after it's popped. Students then graph their results to share. The *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition* provides 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 conservation logs, recording the ways they conserve natural resources. Students answer questions on how the conservation, disposal, and recycling of natural resources impact the environment.
- The materials provide opportunities to compare engineered solutions to natural phenomena. These connections span disciplines, from animal structure and function to base jumpers' developed suits. Students identify how the animal's characteristics support the organism's moves, then apply the analysis to determine how the suits share similarities. The materials provide opportunities for problem-solving in every unit across grade 4. The materials present

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students with a challenging engineering design process through the text. The materials also provide criteria with which to evaluate their prototype. The materials offer numerous opportunities for students to investigate various science disciplines. Students are encouraged to gather data, communicate findings, and make comparisons. The materials provide a focused opportunity to analyze the application of cause and effect to the factors tested.

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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 4 Teacher Edition*, the materials include narrative texts that provide access to phenomena that provide a springboard for learning. However, in the *Teacher Textbook - Grade 4 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 4 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.

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- 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 1 of the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, students are presented with a Design Engineering Challenge to use provided springs to “create a device using the springs that would measure the difference between two objects with different masses.” 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 pushes and pulls, but there are no opportunities to make a connection to how that also relates to cause and effect with regards to slow changes of Earth’s surface.

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

- Grade 4 materials provide an opportunity to leverage students’ prior knowledge and experiences related to phenomena by making connections to previous and future science TEKS in different chapters. For example, inherited and acquired traits are introduced in Chapter 3, as students compare data about eye color and other physical traits common in a family, and then addressed again in Chapter 9 of the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* as students look at the adaptations plants have to survive in their environment.
- Materials provide teacher guidance about potential student misconceptions in students’ prior knowledge. The materials provide opportunities to recall prior information, such as animal and plant life cycles. In another example, in Chapter 3 of the *Learn by Doing STEAM Activity Reader Book - Grade 4*, the materials address mixtures and solutions. The materials initiate the topic with a story and provide an Idea Box with guidance for teachers to facilitate student connections and leverage prior knowledge. The materials suggest students consider what they plan to eat or drink to identify common examples of mixtures. Other examples include prompting students to create a tree map of edible mixtures later in Chapter 3. *Teacher Textbook - Grade 4 Science* materials provide a Background and Misconceptions section to assist teachers in identifying inaccurate or undeveloped prior knowledge, such as fossilization or processes necessary to form sedimentary rock. Another section, Additional Hints, provides instructional support to guide teachers through questioning and inquiry-focused learning to help leverage students’ 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. In a section on Earth and Space, the materials provide a text with background on phenomena and science content. After the text, the materials list a set of preconceptions teachers may anticipate. The *STEAM Activity Guide - Grade 4 Teacher Edition* includes a Teacher Notes section following the stated phenomenon. The notes address the purpose of the upcoming lesson, offer examples related to the phenomenon, and provide connections to future activities. The materials offer phenomena before each Natural Science lesson in the *STEAM Activity Guide - Grade 4 Teacher Edition*. The example addressing



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Organisms and Environments states, “Movement of matter amongst plants, animals, decomposers, and the environment.” The following materials direct students through activities addressing the phenomena through the development of models and extensions. Also, the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* provides Idea Boxes throughout the narrative materials to assist teachers in understanding the concepts and goals.

- The materials outline the scientific concepts behind a phenomenon that identifies the vertical alignment across grade levels. For example, another lesson in the *Teacher Textbook - Grade 4 Science* leverages the phenomenon in the previous grade, focusing on how to plan and conduct investigations, test magnetic properties, ask questions, and make predictions about changes in matter as objects collide.

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## Indicator 3.1

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

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

### Meets | Score 6/6

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

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

Evidence includes, but is not limited to:

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

- Materials introduce content through the text in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition*. Student reader texts provide background connections through the use of idea box prompts and dialogue. The narrative prompts students to think of examples demonstrating content, prior learning, or potentially other units. The text uses a story-based approach where character dialogue introduces, teaches, and connects content. Idea boxes may also address the content. The first lesson component in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition* begins with a setting description and the teacher character asking students to describe what is occurring. The first lesson component describes a group of students working with a teacher to use energy to make a card. In Chapter 2, the text says, “The students explained to Mrs. Chen that they have been learning about different energy. They drew pictures and wrote descriptions of the different energy forms.” The text then includes a definition. Concrete, hands-on activities follow the story to reinforce the content addressed in the story.
- 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,

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“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.”

- The grade 4 teacher materials list concepts students should understand from previous grades. The narrative prompts students to think of examples demonstrating content, prior learning, or potentially other units. The resources support students in building upon content across units or grade levels.
- Materials list Scaffolding Information within the vertical progression. This provides the teacher with information about previous and future learning expectations. The Vertical Alignment Tables do provide TEKS across grade levels and citations of where these standards can be found within the *Learn by Doing STEAM Activity Reader Book* for each grade. The Horizontal Alignment Chart outlines how chapters include different components of TEKS, including SEPs and standards from the previous grade, which mirrors what is included in the Essential Content Guide found in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*.
- The Essential Content Guide provides an overview of how each chapter builds in complexity on content for science, math, and ELAR. For example, in Chapter 1, Hit the Ball, science content builds from Activity 1, exploring the effects of force on an object, to Activity 2, investigating speed and velocity. In Chapter 2, Light Bulbs and Circuits, in the *Learn by Doing STEAM Activity Reader Book*, activities build from differentiating the different forms of energy to identifying conductors and insulators of electrical and thermal energy, to finally, electricity and circuits.
- In the *Teacher Textbook - Grade 4 Science*, the traditional lessons provided include scaffolding information at the beginning that outlines how the standard builds upon work students have covered on a topic in previous grades and how future study builds upon the grade-level TEKS being covered in the lesson. For example, a lesson on solids, liquids, and gases details how students compare and classify the properties of objects in grades K-2 by listing the specific grade-level TEKS and showing the progression of learning in grades 4-5, again by listing the specific grade-level TEKS.

Materials 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 *Learning by Doing STEAM Activity Reader* and then move to the exploration in the *Teacher Textbook - Grade 4 Science*. The *Learning by Doing STEAM Activity Reader* introduces all chapters with fictional characters asking and answering questions. Materials intentionally provide content information before students move to exploration. The lesson plans in the *Teacher Textbook* begin with students engaging with media or discussing the current knowledge. For example, in a PBL lesson on weather, the lesson starts with describing the weather, asking students to describe the current conditions and define weather.
- Materials include a progression of concrete and then representational before abstract reasoning when presenting the concept of magnetism. For example, materials use an approach when describing the physical properties of matter by starting with a phenomenon. In the *Teacher Textbook - Grade 4 Science* lesson on Properties, students conduct an investigation on magnetism. Students predict and test what objects will be magnetic or not. Students use a ruler to measure the strength of the magnetic object's attraction before recording their observations and creating a scale of the strongest attraction to the weakest attraction. Students and the teacher discuss possible causes of strong and weak attractions on different magnetic objects.

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- Materials include a progression of concrete and then representational before abstract reasoning when presenting the concept of mixtures and solutions. For example, the *STEAM Activity Guide* lesson “Amelia Rose Explores Matter and Energy” uses an approach when describing the physical properties of matter by starting with reading a story rather than a phenomenon. The lesson has students work through concrete investigation and draw representational models. Materials in the *STEAM Activity Guide* do show progression through text from representational to concrete through stories (representational), hands-on investigations (concrete), and abstract is represented through some research activities.
- A lesson on inherited traits in grade 4 begins with a short story to activate students’ prior knowledge. Within the text, students are presented with reminders of what was learned in previous lessons and grade levels from the point of view of the students in the story. For example, “the class had also learned about the life cycles of several animals.” The lesson further activates student background knowledge with Idea Boxes, for example, asking students to complete a survey of traits they may have inherited or learned. Materials provide background text before each lesson, allowing students to build on what they already know to increase their understanding of the new content. For example, the Mixtures and Solutions lesson builds on the students’ knowledge of mixtures before introducing physical and chemical changes.
- 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 include an objective in the hands-on portion that states the lesson goals. The same lesson also includes an assessment opportunity.

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

- Materials clearly present core concepts, recurring themes and concepts (RTCs), and science and engineering practices (SEPs). Materials include a pacing calendar that identifies the theme for each unit, such as “Unit 1 - Scientific and Engineering Practices” and “Unit 2 - Matter and Energy,” which includes the knowledge statement for each strand of the TEKS included in the unit.
- Lessons provide instructions for carrying out an introduction, textbook work, and an investigation. Lessons represent concepts, RTCs, or SEPs accurately within each. For example, in the lesson on patterns found in the *Teacher Textbook - Grade 4 Science*, materials state the objective: “Students will collect and analyze data to identify sequences and predict patterns of change in shadows, tides, seasons, and observable appearance of the Moon over time.”
- The 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 *Teacher Textbook - Grade 4 Science*, Daylight House, students discuss patterns in changes in daylight patterns, which builds on the narrative text on patterns students experienced in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*.

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

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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, “These 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. For example, the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition* text describing the water cycle begins with water as a “super-molecule,” addressing the substance's molecular composition, and continues to discuss elements, atoms, and molecules. Also, the text describes the chemical reaction in photosynthesis in the grade 4 *Learning By Doing Grade 4 Teacher and Student Editions*. The TEKS introduce atoms, elements, molecules, and chemical reactions in grade 6. Grade 4 TEKS ask students to classify matter as a solid, liquid, or gas.

- Materials define the boundaries of content that students must master for the grade level. For example, in the grade 4 expository text “Hit that Ball!,” materials provide a text introducing inertia, speed, and velocity. Grade 4 TEKS include student understanding of how forces such as gravity, friction, and magnetism affect an object in motion.
- At times, materials appropriately go beyond some grade-level core concepts and SEPs. For example, grade 4 student materials present accurate information about mixtures in the expository text. Some of the activities involve students looking at the physical properties of the ingredients in a mix, specifically density, which goes beyond the scope of investigating and comparing a variety of mixtures. Students demonstrate and explain what happens to the physical properties of mixtures in grade 5 TEKS. Activity 1 of the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* guides teachers to explain how density is determined, relating mass and volume during the Analysis and Discussion portion of the activity. This extends beyond the grade 4 core concept of classifying matter by relative density, which addresses sinking or floating in water.

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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 4 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*. However, neither the *Teacher Textbook* nor the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* indicates how or when scientific practices or overarching concepts are addressed in each section or within each topic. The inclusion of the Horizontal Alignment Chart, the TEKS 1-5 Content Guides, and 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 STEAM storybook is followed by the activities section. Materials say, "These activities build upon communication, creativity, critical thinking, and collaboration." Materials state, "As students progress through the grade levels, the STEAM storybooks provide opportunities to develop knowledge and skills gradually built through vertical alignment through the TEKS." The description in the *Teacher Program Guide - Grades K-*

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8 Science does not fully support teachers, as it does not reference specific learning. In the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, there are several documents that, when used together, provide specific learning.

- Materials include some guidance that supports teachers in understanding how new learning connects to previous and future learning across grade levels in the Scaffolding Information within the lesson. At the beginning of the Traditional lessons, the Scaffolding Information section provides some information on knowledge students should already have, then lists the TEKS for the previous and future grade levels. Listing the TEKS does not provide enough guidance about connection to future learning. Materials provide minimal guiding documents or information that support teachers in understanding how new learning connects to previous and future learning across grade levels.
- The instructional materials include some guiding documents that support teachers in understanding how new learning connects to previous and future learning across grade levels. For example, the *Learn By Doing STEAM Activity Reader Book - Grade 4 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 pushes and pulls, but there are no opportunities to make a connection to how that also relates to cause and effect with regards to slow changes of Earth's surface. 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 provided background information for teachers that includes explanations and examples of science concepts. For example, the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* provides teachers with information about inertia during a lesson on force and motion. Materials provide information related to the concept and a mind map activity for teachers to complete with students. Materials provided background information for teachers with explanations and examples of science concepts. For example, the *Teacher Textbook - Grade 4 Science* provides teachers with information about evaporation and condensation. The lesson plan provides a Background and Misconception section that informs teachers about condensation and evaporation in nature, as well as how it can be replicated with a cup. The section includes diagrams and key points for the teacher to point out. In the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, there is a reference guide in the appendices that allows for further reading for teachers to deepen their knowledge and provide background information.
- The Background and Misconceptions section provides teachers with information to support the development of their content knowledge. For example, the *Teacher Textbook - Grade 4 Science* provides context for teachers to understand how "waves transfer energy from one place to

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another." The background materials consist of less than a paragraph and a list of teaching tips. Materials provide background on the physical properties of matter in the Teacher Textbook. Materials specifically address mass, temperature, melting point, volume, density, texture, length, and boiling point for the teacher. The Background and Preconceptions sections offer teacher background to support the teacher's understanding of the content. The section mentions the use of balances and scales in the last paragraph but does address the related science and engineering practices. Materials provide reference overarching themes in the background information. The Background and Misconceptions section provides extensive background information, much of it beyond the scope of the current grade level, and is for the teachers' information and background knowledge only as they develop their content knowledge.

- Materials include Teacher Tips to support teachers in developing their understanding of the content and how to further implement the current lesson. For example, in the Properties lesson, the Teacher Tip states, "Hold up a number of different objects. Ask students to describe their properties, and then to compare and contrast them." The publisher lists the Idea Boxes in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* as additional support for this indicator; however, as stated in the resource, Idea Boxes are intended to "stimulate collaborative discussion and reinforce the concepts introduced." Materials do not provide additional resources to support the teacher's deeper content knowledge, such as online resources, current research articles, or podcasts.
- The materials provide explanations and examples of science concepts to support the teacher's subject knowledge. For example, the *Teacher Textbook - Grade 4 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 section Support Notes for Teachers, 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 students' lives."
- 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 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, in the *Teacher Program Guide - Grades K-8 Science*, the Philosophy of Science teacher and learning section states, "TPS believes that we learn best by doing. Science is more than memorizing facts. It is a way of organizing and understating the surrounding universe." The section references active learning, STEAM, storytelling, and inquiry as main strategies. Materials provide information



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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.”

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## Indicator 4.1

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

1	Materials consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers.	M
2	Materials provide multiple opportunities for students to engage with grade-level appropriate scientific texts to gather evidence and develop an understanding of concepts.	PM
3	Materials provide multiple opportunities for students to engage in various written and graphic modes of communication to support students in developing and displaying an understanding of scientific concepts.	M
4	Materials support students to act as scientists and engineers who can learn from engaging in phenomena and engineering design processes, make sense of concepts, and productively struggle.	M

## Partial Meets | Score 2/4

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

Materials 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.

- In the *Teacher Textbook - Grade 4 Science*, materials guide the teacher in explaining, "Science is a process (scientific method), used to investigate the natural world within and around us to generate knowledge to solve problems and improve our world." Materials then describe student behaviors within each step of the scientific method, such as ensuring students consider and include planned steps for how they will collect data during their investigation. The *Teacher Textbook - Grade 3 Science* consistently provides activities that support sensemaking through various activities. For example, the weather chapter includes *The Science*, a section that delivers content through expository text. The chapter also incorporates investigations to support sensemaking through thought-provoking hands-on experiences. *How is Water Recycled?* invites students to process through writing, first to communicate observations in a chart form and then reflect on the processes observed in the investigation.

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- Materials support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers. In the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition*, materials provide reading through storytelling, thinking through the idea boxes, and acting through the design and engineering pieces. There are writing prompts and opportunities to describe what they know or have learned. In the Student Textbook, there are writing activities. Students read like scientists in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition*. Additionally, this component includes idea boxes to support the teacher in having students think like scientists and stimulate critical thinking through class discussion of the chapter texts. Following each chapter, activities allow the students to act as scientists or engineers investigating and designing engineering solutions. The activity sections also include opportunities for the students to engage in age-appropriate letter-word analysis, writing, and math. For example, in the grade 4 lesson "What can fossils tell us about the past?" students use thinking and writing to make sense of identifying fossils.
- Materials provide guidance on activities and discussions similar to sensemaking. There are many examples of sensemaking in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, which has all the components of sensemaking. This approach can be found on the NSTA website (Sensemaking | NSTA). For example, in Activity 3, the students develop a circuit to solve a problem using the Design Engineering Process. They first develop knowledge of the science concepts through the chapter text, idea boxes, and other activities (Phenomena), develop a design of their circuit that meets the scientific requirements for a circuit (Sense of Science), build their circuit using the design engineering process (Practices), and generate ideas through the communication and discussion of their design (Student Ideas).
- 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 4 Student Edition*, Chapter 1, students read about the movement of a ball. The text continues on to discuss velocity and how to calculate velocity and discusses acceleration. Later in the chapter, in "Activity 1 Velocity or Speed?" students are expected to distinguish between velocity or speed situations. These are not grade-level appropriate pieces of scientific text for grade 4. In the TEKS, the concepts of velocity, acceleration, and differentiating between speed and velocity were not introduced until middle school, specifically grade 7, TEKS 7.7B.
- The materials provide some opportunities to engage with grade-level appropriate scientific texts. However, in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, in Chapter 2, Light Bulbs and Circuits, the text discusses forms of energy but introduces, explains, and actively uses the terms kinetic and potential energy, as well as chemical energy. For example, the text states, "All energy is either potential stored energy or kinetic energy, the

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energy of motion. Mechanical energy is the sum of potential and kinetic energy.” While this is scientifically accurate, it is not grade-level appropriate scientific text for grade 4. Potential and kinetic energy is introduced in grade 6, with TEKS 6.8C.

- The materials provide some opportunities for students to engage with grade-level appropriate scientific texts. However, in the student textbook for grade 4, in the section on Matter and Energy, Project-Based Lesson, the materials spend several pages on chemical changes, with keywords such as “chemical change, chemical reaction, endothermic, and exothermic.” Later, in the activity, “What Energy is Hiding?” an energy checklist includes chemical energy as a form of energy, even though it is not listed as a form of energy studied in grade 4. These terms are not grade-level appropriate for a grade 4 scientific text as these concepts are not introduced until middle school in TEKS 6.6E.
- The materials provide some opportunities for students to engage with grade-level appropriate scientific texts. However, in the *Student Textbook - Grade 4 Science*, Science is a Verb activity Waves without Water, the investigation involves a discussion of the wavelength and amplitude of waves. This is not grade-level appropriate scientific text as this is a middle school science topic introduced in grade 8 with TEKS 8.8A.

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

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

- Materials support students to act as scientists and engineers who can learn from engaging in phenomena and engineering design processes. Through scaffolding and guided investigation. In Chapter 8, students study the impact of soil on plant growth. Students predict the best soil for growing plants, combined with an explanation based on their understanding of the preceding text. Materials support the teacher to facilitate the investigation without dictating each aspect of materials and methods. The flexibility allows students to apply the knowledge gained and consider components that can impact the investigation.
- Materials create transfer opportunities for students to take what they have learned and use it flexibly in new situations. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, after reading an expository text on circuits and a short-story text about a light-up birthday card, students use the design engineering process to create a decorative card with a message to be placed in the classroom with a circuit to illuminate it. The activity provides hints for multiple types of circuits, showing flexibility. Materials create transfer opportunities for students to take what they have learned and use it flexibly in new situations. For example, in the Student Textbook, students complete a problem-based lesson, using the design engineering process “to solve a real-life problem that affects us in the classroom or at school.” The lesson guides students through the complete Design Engineering Process to create their own product (solution).

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## Indicator 5.1

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

1	Materials prompt students to use evidence to support their hypotheses and claims.	M
2	Materials include embedded opportunities to develop and utilize scientific vocabulary in context.	M
3	Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and 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 provide support in prompting students to use evidence. For example, in a chapter addressing earth science concepts, the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition* provides an investigation-focused activity. The materials provide the guidance, "Record your hypothesis, materials, methods, results, analysis, and conclusion. If you use drawings, please label them." The directions, such as reminders to collect quantitative and qualitative data and prompts to "record whether their hypothesis was correct and what they learned," are available for teachers. The *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* offers prompts for the teacher in Activity 7. For example, the materials state, "Remind (the students) that hypotheses are tentative and testable statements supported by limited evidence." The same activity for students states, "Write your initial observations and

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hypothesis, and then record, in writing and labeled drawings, your materials, methods, results, and conclusion.”

- The materials prompt students to support their hypotheses and claims. For example, the activity “Plant Growth in Different Soils” from Chapter 8 of *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, prompts teachers to have students “record whether their hypothesis was correct or not correct, and why and what they learned from this experiment.”
- The materials prompt students to use evidence when supporting their hypotheses and claims. For example, in the lesson What Energy is Hiding in the *Teacher Textbook - Grade 4 Science*, students are prompted to provide evidence for the claim, “Some say that sound energy is mechanical energy.”
- In the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition*, students analyze shadows during the year. Materials ask students to describe their results (evidence) after a year of collecting data and explain where their predictions are correct and why, followed by a series of questions that can only be answered using evidence. In an investigation comparing magnetism, students are told to discuss their results and answer follow-up questions using support from their results to explain why. In the *Student Textbook, Grade 4 Science Lesson 6B, C - SIAV - Let’s Get Popping*, the students investigate popping corn and the mixture of popped to unpopped corn. After collecting their data and data from classmates, students create a bar graph and are prompted to make claims.

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 4 Student 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 - Grade 4 Science*, materials provide a keyword chart with vocabulary words and their definitions.
- Materials present scientific vocabulary using word wall charts with the vocabulary word and its definition. Students are then asked to find the words within the chapter as a word wall activity. Materials present scientific vocabulary given to students within the informational text in bold letters, used in a sentence, and embedded within the written materials.
- The materials provide opportunities for students to apply scientific vocabulary within context. For example, in the *Teacher Textbook - Grade 4 Science*, the materials provide a lesson in Unit 2 on changes. The lesson includes a discussion of scientific concepts. Independently, students complete a glossary of key terms at the end of the reading and an investigation where students observe a demonstration of states of matter changes in water. The activity provides a prediction time where students write what they predict will happen. They watch the demonstration and then discuss as a class what they observed. The activity provides opportunities for students to use scientific vocabulary such as “vapor” and “condensation” in writing and speaking. The materials also support Emergent Bilingual students, stating, “Ensure that students are familiar with all the vocabulary of state and changes of state. Have students use language they find accessible... If they have trouble writing, they could make observations verbally.”

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

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



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based lesson invites students to make observations and measurements to produce an argument from evidence. Materials offer limited guidance on how to do this but suggest students develop and use models, plan and carry out investigations, and conduct investigations. These suggestions don't offer the necessary support for students to engage in the process of argumentation via a vis gathering evidence, using evidence to support your argument, and then responding to discussion and critique of your argument.

- Materials provide some opportunities for students to develop how to engage in the practice of discourse. The *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition* offers Design Engineering Challenges at the end of each chapter. Activity 9, Spring Scales, asks students to design a spring scale to measure gravitational force. Materials provide a Design Engineering Process with steps and explanations for completing the task. The steps are to ask what's the problem, imagine and design solutions, build the solution, test it, improve it, and communicate a successful solution. While these are useful skills for discourse, engaging in argumentation is minimally present in the materials.

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 share investigation results but not construct arguments to justify their conclusions based on evidence. For example, in *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, Chapter 6, Activity 3, students investigate the presence of water vapor. In the conclusion phase of the investigation, the materials ask students to “record whether their hypothesis was correct and if not why.” There is no mention of constructing an argument for their explanation based on evidence acquired during the investigation.
- Materials provide some opportunities to construct and present verbal conclusions, not arguments based on evidence. In *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, Activity 1, Open and Closed Circuits, students write their hypotheses for the investigation. Students then use the guided questions from the teacher to analyze and discuss their data with their peers. Using the data and discussions, students must defend their hypothesis or explain why they were wrong. However, the lesson does not instruct students to construct an argument based on evidence.
- The materials provide some opportunities for students to justify explanations of phenomena and solutions to problems. For example, the Organisms and Environments Unit in the *Teacher Textbook - Grade 4 Science* includes an activity where “students test adaptations of different bird beaks to determine which bird beak is best suited for certain foods.” The Additional Hints section states, “After students have completed this activity, have them design their own animal, keeping in mind what physical characteristics they are adapted for. To assess, students must explain and justify the characteristics they added.” This does not instruct students to construct a written or verbal argument based on evidence from the learning experience of using different “beaks” in the activity.

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## Indicator 5.2

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

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

### Meets | Score 4/4

The materials partially 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. 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."
- Other suggestions to respond to struggling learners include studying keywords and using them correctly in a sentence, using "an arts project from the *STEAM Activity Guide - Grade 4 Teacher Edition* for relevant TEKS," and going back to "an earlier grade to ensure prior grade learning is completed."
- The materials provide teacher guidance to students' responses, including how to build on students' thinking. For example, Support Notes included in the Unit 2 lesson on Mixtures and Solutions, from the *Teacher Textbook - Grade 4 Science*, notes, "Students may struggle with the idea that a solution is a type of mixture because one of the materials which it is part of it has disappeared. There are two possible routes to solve this, either you could allow them to taste a mixture of sugar and water to ascertain that the sugar is still there, or you could separate a solution to show that it is made up of the original constituents. "The guidance supports science

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knowledge. Materials provide teachers with some student responses to questions and tasks. For example, the Water Cycle unit materials have a table for students to complete, linking their investigation with the stages in the water cycle, with possible student answers.

- Materials in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* provide some possible student responses to questions and tasks. For example, in the Force, Energy, and Motion unit, students are asked some questions to assess their text comprehension.

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

- The materials provide guidance for the teacher on how to support students' use of scientific vocabulary in context. For example, the *Teacher Textbook - Grade 4 Science* lesson How Can You Classify An Object? suggests that if there are "words being used that a student may not recognize or understand, take the time to discuss such words in order for them to be added to student vocabulary." Another lesson in the Teacher Textbook, Properties, includes guidance in the ELL section stating students should "practice describing objects in terms of the properties with a partner."
- Each chapter in the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* includes an activity for students to work with vocabulary words and terms. For example, in Chapter 8, Activity 8 of the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, the guidance provided for teachers is to review vocabulary "using the TPS vocabulary cards." The purpose of this activity is "for students to understand [the words'] meaning(s) and recognize them when spoken."
- In the *Teacher Program Guide - Grades K-8 Science*, materials provide vocabulary strategies teachers can use to scaffold students' development of scientific vocabulary. Strategies include how to create and maintain a word wall and strategies to help students deepen their understanding of the vocabulary words. In the *Teacher's Textbook*, the lesson on The Rock Cycle supports teachers by giving them the key vocabulary words before the start of the lesson. Materials also tell the teacher how the vocabulary will be presented to the students and suggestions on how to implement the vocabulary.
- The *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition* offers a story addressing lunar cycles and weather vocabulary. The text contains many terms throughout. After the reading, students respond to comprehension questions and conduct investigations. The materials also provide a list of vocabulary terms at the end of the chapter for review.
- The materials provide embedded support for the teacher in how to introduce and scaffold students' development of scientific vocabulary. For example, the *Teacher Textbook - Grade 4 Science* lesson on Changes guides teachers to display pictures of all three states of water with the following guidance: "Show students the images... Ask questions to remind students of work done in previous grades on states of matter and how matter changes from one state to another. Remind students of all the associated vocabulary." The materials provide a short list of example questions. teachers will locate associated vocabulary, in "Key Terms" of the student materials section.
- The materials provide embedded support for the teacher in how to introduce and scaffold students' development of scientific vocabulary. For example, the *STEAM Activity Guide - Grade 4 Teacher Edition* provides a Science/ELA Word Wall Activity in Unit 4. Teachers are advised to use the TPS Crosscutting Library of photographs to include in a warm-up critical thinking exercise. The guidance states, "Have students choose a photograph which they believe is linked to evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation...."

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At the end of content delivery for this section, ask students to review the chosen photograph again. Were their initial thoughts correct? What have they learned?" This *STEAM Activity Guide - Grade 4 Teacher Edition* activity is intended to be used as an extension or additional lesson to support struggling students with scientific vocabulary development and does not occur during initial instruction of vocabulary.

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

- Materials provide guidance that teachers can use to provide feedback to students while using evidence to construct claims. For example, the *Assessment Guide - Grade 4 Teacher Edition* provides a performance task within the Matter and Energy unit. The performance task asks students to “use a panel of tests and observations to characterize five different substances by their properties. Use your data to identify one of them as a mystery substance.” The Guide provides a 4-point rubric. To score 4 points, students must “exceed all the required elements of the prompt.” To score 3 points, students must “meet all the required elements of the prompt.” The rubric continues to 0 points.
- Materials provide teacher support to prepare for student discourse. In the *Learn by Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, teachers are prompted to “stress the importance of actively listening to other students during sharing and participating in discussions respectfully” during the analysis phase of investigations using the scientific method. 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”.
- 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 teacher questions for supporting student discourse and the use of evidence in constructing written and verbal claims. For example, in the *Assessment Guide - Grade 4 Teacher Edition*, materials ask teachers to “prompt” students into a particular way of thinking. The *Teacher Textbook* includes a Project-Based Lesson in Unit 5. Students investigate different types of bird beaks and the food they are best suited to pick up through the use of eating utensils, such as chopsticks. The investigation includes a questions portion. One question reads, “What

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type of food would the knife be best adapted for?” The *Teacher Edition* provides the following answer: “Answers will vary. Ensure students accurately support their answer.”

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

- Materials provide teacher guidance to engage students’ thinking in various modes of communication. For example, a lesson on mixtures in the *STEAM Activity Guide - Grade 4 Teacher Edition* prompts teachers to “ask students to think about their prior knowledge of evaporation” after students complete a written response. Materials continue to prompt teachers to “give the students time to have a full discussion about what they already know” and to “use this time to correct any misconceptions and answer any questions.”
- Materials provide teacher guidance to engage students’ thinking in various modes of communication throughout the year. For example, the *Assessment Guide - Grade 4 Teacher Edition* includes sample responses to “Focus Questions” for the lesson Solving Problems. Specific guidance is provided about communication in the *Teacher Textbook - 4th 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 resources to facilitate student thinking in the activity Stream Tables. After conducting an investigation, students received several questions, including, “What were the parts of the stream table, and how were they interdependent?” The questions assist students in processing their thinking before they engage in discussion with the class. The materials offer additional questions to support teachers throughout the discourse. An activity addressing energy provides an opportunity for students to communicate their findings and presentation.
- Materials provide teacher support for facilitating the sharing of students’ finding solutions. Materials provide feedback, tips, or examples teachers can use to support students throughout the learning cycle. For example, the *STEAM Activity Guide - Grade 4 Teacher Edition* includes a Word Wall Read Aloud Activity in Unit 4. Students work in small groups to “design a renewable energy house.” The *Teacher Edition* provides the following support: “Have each team create questions a house buyer might ask about energy being used. Include both verbal and written statements using multiplicative comparisons and multiplication equations supporting the energy type’s use as compared to non-renewable energy types.” Teachers can locate a general description of the DAPIC process in the back of the *Teacher Program Guide* as a scaffold.

# TPS STEAM into Science Grade 4

## Indicator 6.1

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

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

### Meets | Score 2/2

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

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

Evidence includes but is not limited to:

Materials include a range of diagnostic, formative, and summative assessments to assess student learning in a variety of formats.

- The *Learn By Doing STEAM Activity Reader Book - Grade 4 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 4 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 4 Teacher Edition*. For example, the Force, Matter, and Energy unit in grade 4 contains four Science Assessment Questions.” The assessments contain a variety of formats that include multiple-choice questions, open-ended questions, and performance tasks. For example, a performance task in the Force, Matter, and Energy units asks grade 4 students to answer questions about a mystery substance in order to identify it.

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- 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 4 materials provide two benchmark assessments in the Blackline Masters.

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

- Materials indicate which student expectations are assessed. For example, materials provide both the TEKS correlations for each assessment item and the answer keys for every assessment. In the *Assessment Guide - Grade 4 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. Assessment items indicate only one standard per assessment question/task. Several assessment items assess more than one TEKS. The materials assess all student expectations, as outlined in the TEKS. The materials include an assessment generator that includes at least one question per expectation. Each lesson in the *Teacher Textbook - Grade 4 Science* identifies the TEKS that are assessed in formative and informal assessments.
- The materials include a content guide that provides information on how TEKS 1-5 are integrated into lessons.
- Materials 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."

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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 4 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 orbits. It focuses on the transfer of heat energy. Materials include assessments requiring students to integrate scientific knowledge and science and engineering practices with recurring themes appropriate to the student's assessment expectation. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 4 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 4 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 expectations being assessed. For example, in the *Teacher Textbook - Grade 4 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.

- The *Assessment Guide - Grade 4 Teacher Edition* provides activities that address content in new and novel forms using multiple assessment options. For example, students complete a performance task to identify the properties of meats in the matter and energy unit. The materials also address other substances and mixtures. In the fourth grade, students collect data about weather and climate across Texas during instruction in the *Teacher Textbook - Grade 4 Science*. The *Assessment Guide - Grade 4 Teacher Edition* includes a performance task for students to research the climate of another state with a contrasting climate. Students collect weather and climate data such as "temperature, precipitation, wind speeds, and hours of sunshine," create a data table to show the comparison between both locations, and create an appropriate graph with both sets of data. Instructions beneath the data table direct students to write a paragraph "to compare the climates in their own state with that of the other."
- Materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. For example, in *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, Chapter 8, students first observe how plant growth is affected by the soil it's grown in. Next, students investigate and explain how producers can make their own food. Materials include assessments that require students to apply knowledge and skills to a new



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phenomenon or problem. For example, in the *STEAM Activity Guide - Grade 4 Student Edition*, students follow the DAPIC process to assess their knowledge of force, motion, and energy. Students design and build a pinball machine, first using their knowledge of force and motion to build the structure, then their knowledge of energy to add lights and sound to their game.

- Materials include assessments that allow students to apply knowledge and skills in a variety of contexts. For example, after students investigate mixtures and solutions in the *Student Textbook - Grade 4 Science*, they can be provided with science assessment questions in the *Assessment Guide - Grade 4 Teacher Edition*. Students answer open-ended and multiple-choice questions and perform two performance tasks. In the first performance task, students observe the chemical reaction of copper coins and lemon juice and write down an explanation. In the second performance task, students “demonstrate that mixing of two or more substances sometimes results in a new substance and sometimes doesn’t, providing an explanation.” Materials include assessments that allow students to apply knowledge and skills in novel ways. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, students research the climate in their region of Texas to understand the difference between weather and climate. After completion of the activities, they can be provided with a performance task in the *Assessment Guide - Grade 4 Teacher Edition*. Students create a “pictograph to show typical weather conditions expected during a particular season and describe two other ways to model the same data.”

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## Indicator 6.2

Materials include guidance that explains how to analyze and respond to data from assessment tools.

1	Materials include information and/or resources that provide guidance for evaluating student responses.	M
2	Materials support teachers' analysis of assessment data with guidance and direction to respond to individual students' needs, in all areas of science, based on measures of student progress appropriate for the developmental level.	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 4 Science*, which provides guidance in red text for evaluating student responses to every activity/question.
- The *Learn by Doing STEAM Reader Book - Grade 4 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 4 as a resource for evaluating student responses. Materials include an assessment question or task followed by sample responses that determine mastery.
- The *Assessment Guide - Grade 4 Teacher Edition* provides rubrics for performance tasks. For example, in Grade 4, students engage and ask yes or no questions to get other students to determine which piece of matter they have. The scoring rubric that is provided has a 3-point scale and says for 3 points, "Students participate fully, with accurate answers and logical questions based on previous questions and answers. Quick and knowledgeable identification of substances based on the information available."

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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 4 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 4 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

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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 4 Science*, the *Student Journal - Grade 3 Science*, the *STEAM Activity Guide*, the *Assessment Guide - Grade 4 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 4 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 and vocabulary-building activities.
- Additionally, Support Matrices provide teachers with guidance on materials to use when supporting students but do not provide guidance as to how to support them. The materials do not guide which specific lessons or activities from the STEAM Activity Guide should be used for level 1 students who score Some proficiency on the Learn By Doing Assessment Rubric.
- Materials include support to offer students with various needs in the activities found in the *Teacher Textbook - Grade 4 Science* but do not guide teachers in responding to data. For example, the lesson Solar System directs teachers that “some students will need to be directed to a specific site or page which contains all the information they need” rather than responding to the data collected from the activity.

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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

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

Assessments contain items that are scientifically accurate, avoid bias, and are free from errors. Assessment tools sometimes use clear pictures and graphics that are 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 with 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 4 Teacher Edition*.
  - For example, the *Assessment Guide - Grade 4 Teacher Edition* includes an assessment that accurately focuses students on the lunar cycle rather than the individual phases of the Moon.
  - The Interactive Assessment Tool contains items that align with grade-level concepts in a scientifically accurate way. One assessment item includes examples of forces in the student expectation as options to describe a classroom investigation.
  - Materials in the *Teacher's Textbook* correctly describe the flow of energy within a food chain, using the correct terminology and not omitting a step in the flow of energy process. In another assessment, materials accurately present all steps within the carbon dioxide-oxygen cycle.

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

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

- Materials provide 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 #173 states only to “identify a cause and effect relationship in nature.” while #131 says explicitly, “Work alone. Identify two renewable resources.” Another item, #134, tells students to work with a partner.
- The *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 STEAM Activity Reader Book*, materials state that “teachers will assess

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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 4 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.”

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, one assessment in the *Teacher Textbook - Grade 4 Science* asks students to draw and label a diagram showing how the carbon dioxide-oxygen cycle works and then describe why the cycle is vital to plant and animal survival. One accommodation appears in the teacher guidance under ELL, stating, “If students do not have the grasp of English to complete the Textbook Work involved in the Investigation, allow them to express themselves verbally and ask someone to transcribe their words.” The materials do not guide teachers to provide oral administration of the assessment or other accommodations, such as blank graphic organizers or access to dictionaries.
- 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 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.

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## Indicator 7.1

Materials include guidance, scaffolds, supports, and extensions that maximize student learning potential.

1	Materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved 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 4 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 4 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.”



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- Materials include teacher guidance for scaffolding instruction during lessons under the Support headers in the *Teacher Textbook - Grade 4 Science*. This guidance is sometimes generalized for all students and not specific to students with learning gaps. For example, in the Energy lesson, materials state: “Some students will be distracted by the amount of information available to them. Emphasize the time limit and the fact that you want an answer for each form of energy. They can make their notes fuller if they like once they have found each energy form.” 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 4 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 extend enrichment for all students through ELA/Literacy and Math Connections. The materials encourage students to consider the content application in other ways, allowing students to lean on stronger or preferred subjects. An example in Matter and Energy in the *STEAM Activity Guide - Grade 4 Student Edition* asks the students to conduct short research projects that use several sources to build knowledge in the thorough investigation of the different aspects of a topic “as a bridge to literacy.” For mathematics, the materials ask students to “model with mathematics” or “reason abstractly and quantitatively.” The supports provided further in the text ask students to create a poem using vocabulary words and construct a pictogram, which are general for ELA and mathematics, respectively. The materials extend enrichment opportunities to students at all levels through target research that connects to the content addressed in the story. In the Science/ELA Word Wall Activity, the students refer to the class content to locate specific quotes that describe scientific concepts such as heating and changes in substances.
- Materials provide enrichment activities that account for learner variability. For example, each chapter includes a variety of activities that appeal to students' interests and abilities. The chapter “Why do I look like my parents?” consists of seven activities: Activity 1, students interpret a graph; Activity 2, students draw self and family portraits; Activity 3 focuses on reading comprehension; Activities 4 and 5 focus on math; Activity 6 focuses on exploring and describing traits, and Activity 7 on vocabulary. Each chapter in the *Learn By Doing STEAM Activity Reader Book - Grade 4 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 “Why do I look like my parents?” students make connections using Idea Boxes by discussing how babies in their families are taken care of, and students use mathematical practices to conduct a survey on inherited traits and create a bar graph.

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

- The materials provide scaffolds and guidance for just-in-time learning acceleration in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*. Each chapter contains several Idea Boxes within the text, giving the teacher prompts and cues to support student understanding. For example, in Chapter 9, Survival, Idea Box 2 prompts teachers to “share a

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migratory map for a specific animal with students” and “discuss how far the animal has to travel and the reasons for the animal migrating.” 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.

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## 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 *Teacher Textbook - Grade 4 Science* includes diverse opportunities with developmentally appropriate instructional approaches to help the students achieve mastery. An example in the Force, Motion, and Energy chapter offers on-level expository text, guided research, and investigations to support students. The materials extend various grade-appropriate instructional approaches to engage students with the content. Examples include small group investigations, class readings with periodic questions, and exploring concrete examples. The chapter on matter and energy asks students to investigate objects in their classroom to create a poster describing physical properties.
- Lessons present opportunities for student-led investigations. In the *Teacher Textbook - Grade 4 Science*, students design an experiment to test the effect of force on an object. Materials engage students in the mastery of the content through a variety of developmentally appropriate instructional approaches. For example, lessons include connections to scientific concepts in the real world. In the lesson on energy transformations, students investigate how music is made by an object colliding with another with the changes in energy.

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- Materials engage students in mastery of the content through a variety of developmentally appropriate instructional approaches. For example, in Chapter 6 of the *Learn By Doing STEAM Activity Reader Book - Grade 4 Teacher Edition*, students engage in multiple activities to support the following essential science content: the water cycle and weathering, erosion, and deposition from water, wind, and ice. Teachers read aloud a narrative text, introducing the science concepts as a class faces their first day of winter and the science activities that occurred as a result of the discussion. Students engage in multiple activities relating to the text concepts. In Activity 1, students engage in reading comprehension through a series of questions relating to the text. In Activity 2, students draw, label, and describe the water cycle. In Activity 3, students engage in the scientific method to investigate the presence of water vapor. In Activity 6, students review key science terms related to the content. The lesson includes hands-on investigation, modeling and drawing, discussion, reading, and written work.

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

- The *STEAM Activity Guide - Grade 4 Teacher Edition* recommends varying groupings to support students as they progress through instruction. In the Die Cutting Exercise activity, students observe the changes in the state of candles and water as a class. The students then investigate other physical changes independently. The lesson resources in the *STEAM Activity Guide - Grade 4 Student Edition* support different student groupings, such as independent work, class discussion, and small group investigation. For example, the materials ask students to get into small groups to review a story and determine how they can mimic the child's actions to explore physical properties independently as homework.
- The materials support a variety of instructional groupings during the lessons. Lessons on core content involving text in the *Teacher Textbook - Grade 4 Science* are provided to the whole group, while investigations frequently provide suggestions for small group and individual work. For example, in an investigation on the conservation of matter, the student directions say to “collect the items above for your group” and then also tell students to “record your answer” in the space provided. The materials support a variety of instructional groupings. A lesson on energy in the *STEAM Activity Guide - Grade 4 Teacher Edition* suggests student groupings during different activities. For example, suggestions are provided for small groups during an engineering design activity, for small groups then whole groups during a word wall activity, and then for pairs in a student activity.

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

- The materials support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide 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 4 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 4 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

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program supports modeled, guided, and collaborative practice. The materials offer multiple types of practices but lack guidance and structures for achieving effective implementation.

- The materials provide some general guidance to recommend the Design Engineering Process to support students' communication. For example, the resources state, "During the sharing phase, encourage the children to actively listen to other children and participate respectfully during discussions." However, the materials do not offer detailed structures for implementation, and the recommendations are not content-specific without relevant support for teachers.
- The materials provide teachers with some guidance for implementing multiple types of practices but do not provide structures for implementation. For example, the *STEAM Activity Guide - Grade 4 Teacher Edition* provides teachers guidance on a STEM project where students create pinball machines. The beginning of the lesson includes an overview of the objective with helpful details such as, "A good rule of thumb is that a pinball machine should be about twice as long as it is wide, and the playing surface should be at about a 10-degree angle." The lesson provides a step-by-step text, guiding students in building their pinball machine. The Teacher Edition provides additional guidance for each step. The lesson is broken up into sections that include Explore It, where students build components of their pinball machine; Describe It, where students respond to questions about their exploration; and Use It, where students reflect on their build. Materials do not provide structures for assessing student mastery of content knowledge nor label specific standards to each part of the pinball machine build. It is unclear how this STEM project supports the content standards. However, the materials do not provide resources for the teacher that specifically focus on the different types of practice and how to most effectively implement them.

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

- Materials represent diverse communities using information that is respectful and inclusive. For example, information in teacher guidance documents and student materials portrays a diverse group of scientists and engineers as outlined in the science and engineering practices. Materials represent diverse communities using information that is respectful and inclusive. For example, the information provided in the Learning Strategies and Scaffolding section of a lesson on the physical properties of rocks references that "some minerals are highly prized by particular cultures, like turquoise for Native Americans or jade for Chinese and Japanese cultures."
- In the *Learn By Doing STEAM Activity Reader Book - Grade 4 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. Images reflect the diversity of school communities and match the content. Characteristics vary in images to include race and ethnicity, skin tone, and hair texture. For example, in the story Amelia Rose Explores, the image of Amelia and her Girl Scout troop represents a diverse group of girls of different races.
- In the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, the short story reader Thanksgiving Trail Mix features characters that represent individuals of diverse backgrounds, including gender, ethnicity, and cultural tradition. Materials represent diverse communities using images and information that are respectful and inclusive. In the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, the main text includes information and characters that represent diverse backgrounds, including ethnicity, race, location, and gender. For example, the text includes a character who represents Indigenous Native Americans.

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## 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 4 Science*. For example, in the Grade 4 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 4 lesson, Properties, advises teachers: "This standard contains a lot of important vocabulary which will help students both in their science and in other areas of the curriculum. Ensure that they learn the meanings of all new words. Encourage students to use prior knowledge and experiences to help them understand the meanings of new words. The Patterns lesson offers one suggested ELL support: "Some ELL students may need to dictate their answers

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to the questions in the Investigation. Alternatively, have them work with a partner. Once you are sure that are taking as full part as they are able to in the discussion, allow them to copy their partner's answers. Encourage students to use prereading supports such as diagrams included in the textbook. Provide students with other diagrams, illustrations or mind maps to help them with their 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 4 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: "Share information in cooperative learning interactions" and "Express opinions ideas, and feelings...on a variety of social and grade-appropriate academic topics." 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 4 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 include strategies for supporting emergent bilingual students under the Tips for ELL Students headers in the *STEAM Arts Project Guide K-12* Grade 3 lessons, these suggestions encourage the use of students' first language. 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."

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## 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 4 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.



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- Additionally, the *Family/Caregiver Guide - Grades K-8 Science* includes links to online materials, and the section included in the *Teacher Textbook - Grade 4 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 detailed information to share with caregivers about the design of the program. For example, the program includes a Family/Caregiver Guide. The guide includes a list of TEKS from K-8, allowing caregivers to review the standards that will be covered throughout the course of the year. Materials provide information to share with caregivers about the design of the program. For example, the program includes family online access. The Family/Caregiver Guide provides screenshots of the online access and lists components caregivers will see, including digital access to homework. The guide also provides online resources for students and caregivers to gain more information about what the program provides. The guide consists of pages illustrating the components of the student edition and the sequence followed in each lesson.
- Another example includes "Philosophy of Science Teacher and Learning," which provides examples of how "Science is more than memorizing facts. It is a way of organizing and understanding the surrounding universe." The materials provide information to share with students and caregivers about the design of the program. For example, the Teacher Program Guide states that materials "provide caregivers with TEKS and ELPS information provided to share and discuss with students."

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

- Materials 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 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."
- The *Teacher Textbook - Grade 4 Science* lessons include an At Home section with specific suggestions for home reinforcement. For example, this section in the Conductors and Insulators lesson offers the following information to be shared with caregivers: "Talk about different materials which conduct or insulate heat" and encourage children to "investigate the materials his or her clothes are made from" to determine which materials provide better insulation. Additionally, the Food Chain lesson in Unit 5 asks caregivers to "discuss with your child where their food comes from and how it gets to their plate. Talk about farming crops, animals, fishing, food processing, and packaging."
- Materials mention in the *Teacher Textbook - Grade 4 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 4 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

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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 4

## Indicator 8.1

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

1	Materials are accompanied by a TEKS-aligned scope and sequence outlining the order in which knowledge and skills are taught and built into the course materials.	M
2	Materials provide clear teacher guidance for facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts.	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 4 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

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throughout program components. Additionally, the *Learn by Doing STEAM Activity Reader Book - Grade 4 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 4 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?” 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 4 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 also provide spiraled practice using the Assessment generator and Interactive software tools. This tool provides, by TEKS, by skill level questions. There is also an interactive software tool loaded with web-based auto graded questions and teachers can add their own content into this tool.
- Materials provide suggestions for knowledge and skills spiraled through different activities. For example, the *Teacher Textbook - Grade 4 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 4 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 review and practice opportunities in the *Learn By Doing STEAM Activity Reader Book – Grade 4 Student Edition* to support mastery and retention..
- Materials include project-based lessons incorporating multiple standards within an investigation, including some previously taught.

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## 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 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 that offer 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 4 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.

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- 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 recommends teachers develop mind maps to support students’ recall of examples of force. The materials include a References Cited section to support activities such as in “Fourth Grade Super Water,” “Super Storms,” and “Super Cooks!” The article “America’s Students: Providing Early Exposure to STEM (Science, Technology, Engineering, and Math) Initiatives” follows the activity and several other resources.

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

- Materials include a grade-level scope and sequence at the beginning of the *Teacher Textbook - Grade 4 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 4 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 4 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 4* 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 *Assessment Guide Teacher Edition* provides a list of materials needed for each portion of a lesson. For example, materials include a list of supplies students will need to use to conduct an investigation of the water cycle.
- Teachers can view a list of materials needed for specific lessons in the Teacher Textbook in the different investigations. For example, Activity 4, “Speed and Velocity,” lists metric rulers, meter sticks, magnets, and other materials to support students as they investigate forces. The instructional resources provide extension opportunities with a list of materials, such as Idea Box 2 in the *Learn by Doing STEAM Activity Reader Book Teacher Edition*. In this example, notes specify musical instruments, solids, and fluids to investigate the sound. The resources list physical materials to support the lesson, such as in Activity 4, “Shadows in the Sun.” The materials advise teachers to gather Celsius thermometers, meter sticks, and cameras for investigation.
- Materials provide a STEAM into Science Grade 4 Textbook Kitting List, which alphabetically lists all required materials to complete activities and investigations.

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

- The materials provide teacher guidance for safety practices during the “Working Safely and Responsibly” lesson in the *Assessment Guide Teacher Edition*. The lesson provides opportunities for teachers to explain the importance of safety equipment, such as safety goggles and expectations for being safe during an investigation. Materials provide 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, 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 reminders for teachers to discuss safe practices before investigating electricity. The instructional materials include a section called Idea Box, which provides recommendations for safely implementing the lesson. Idea Box 2 reminds teachers to discuss the damaging sun’s rays and the use of sunscreen for protection.

# TPS STEAM into Science Grade 4

## Indicator 8.3

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

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

## Meets | Score 2/2

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

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

Evidence includes, but is not limited to:

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

- The grade 4 Scope and Sequence in the *Teacher Textbook - Grade 4 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 4. For example, the *Teacher Textbook - Grade 4 Science* includes the time required for a lesson on identifying sequences and predicting patterns of change in seasons as needing 150 minutes or three 50-minute class periods. The materials include guidance on scheduling considerations for covering required science content for grade 4. For example, the *Assessment Guide - Grade 4 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 requiring 20 minutes, a minimum of 30 minutes for hands-on investigation, and 5 minutes for lesson summary.
- Materials in the *Teacher Textbook - Grade 4 Science* 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 4 Science* supports scheduling considerations, listing the number of days needed to complete each unit.



## TPS STEAM into Science Grade 4

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

- The grade 4 materials provide guidance for implementing the sequence content that is recommended to be taught consistent with the developmental progression of science. The Scope and Sequence found in the *Teacher Textbook - Grade 4 Science* provides a suggested sequence of units that follows the reporting categories outlined in the knowledge and skills (TEKS) for grade 4 science. Materials provide guidance for strategic implementation that promotes the sequence of content taught in an order consistent with the developmental progression of science. For example, the Looking at Mixtures and Solutions investigation in the *Teacher Textbook - Grade 4 Science* builds on earlier learning of making and recording observations as students create and analyze different mixtures and solutions. Materials in the *Assessment Guide - Grade 4 Teacher Edition* suggest that the sequence of content is taught in an order consistent with the developmental progression of science within the different tasks included. For example, students complete a performance task after instruction on classifying matter by physical properties has occurred.
- Materials provide guidance for strategic implementation that promotes the sequence of content taught in an order consistent with the developmental progression of science. For example, the Looking at Mixtures and Solutions investigation in the *Teacher Textbook - Grade 4 Science* builds on earlier learning of making and recording observations as students create and analyze different mixtures and solutions. The Pacing Calendar in the materials from the *Teacher Textbook - Grade 4 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 view reflecting how the course fits within a single school year. The *STEAM Activity Guide - Grade 4 Teacher Edition* includes extensions with page numbers indicating where to locate the initial instruction. The *STEAM Activity Guide - Grade 4 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 4 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 8 weeks for revision, assessment, and reteaching. This allows room for adjustment to local time and scheduling constraints.

# TPS STEAM into Science Grade 4

## Indicator 9.1

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

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

## Not Scored

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

Materials do not include an appropriate amount of white space and a design that 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 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 4 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 Science is a Verb lesson, What Will Dissolve in Water? in the *Student Textbook - Grade 4 Science* begins with two single-spaced pages of background information under the heading The Science. Aside from six headers in bold, the text lacks formatting or other features to break up the information and support student understanding. The lesson also includes an investigation with a list of seven ways to represent data, followed by an image and description. The paragraph and list text blend together without formatting or white space to grab students' attention and support understanding.
  - For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 4 Student Edition*, some text in Chapter 5, Waste, Recycle & Reuse! appears larger, bolded, and in a different font type from the rest of the story. This text is usually dialogue, but not all the dialogue is formatted like this, so students need to figure out why this information is bolded. Some of the images provide captions, but sometimes these are in a smaller font

## TPS STEAM into Science Grade 4

than the majority of the text, but other times, it is larger, bolded, and in a different font type. The lack of consistency distracts the reader from pulling information from the text.

- For example, each chapter in the *Learn By Doing STEAM Activity Reader Book - Grade 4 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 7 of the *Learn by Doing STEAM Activity Reader Book - Grade 4 Student Edition*, the materials present a cartoonish picture of a meteorologist exhibiting a facial expression that distracts students and detracts from the presented information.
  - For example, in the *Student Textbook - Grade 4 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 4 Science* includes a clipart image of an unplugged electronic device. The text on the page, titled The Science, explains the concept of forms of energy.

Materials include digital components that are free of technical errors.

- The materials include digital components that are free of technical errors.
  - For example, the *STEAM Activity Guide - Grade 4* includes activities free of inaccurate content materials or information. The materials are also free of wrong answers to questions asked. For example, the STEM activity “Bells and Whistles” includes accurate information about how holiday lights respond to batteries of different voltages, including a warning not to use a single light in a wall outlet.

For example, in the *STEAM Activity Guide - Grade 3 Teacher Edition*, Chapter 1, teacher digital materials are free of spelling, grammar, and punctuation errors. In the *Teacher Textbook - Grade 3 Science*, Life Cycle, teacher digital materials are free of inaccurate content or information.

# TPS STEAM into Science Grade 4

## Indicator 9.2

Materials are intentionally designed to engage and support student learning with the integration of digital technology.

1	Materials integrate digital technology and tools that support student learning and engagement.	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 with the integration of 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.

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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 4

## Indicator 9.3

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

1	Digital technology and online components are developmentally appropriate for the grade level and align with the scope and approach to science knowledge and skills progression.	No
2	Materials provide teacher guidance for the use of embedded technology to support and enhance student learning.	No
3	Materials are available to parents and caregivers to support student engagement with digital technology and online components.	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."

## TPS STEAM into Science Grade 4

- 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.
  - For example, materials provide an e-letter that provides online access to materials, resources, and activities to reinforce student learning and development.