

# TPS STEAM into Science Grade 8

## TPS STEAM into Science Grade 8 Executive Summary

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

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

### Section 2. Instructional Anchor

- The materials are 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.

# TPS STEAM into Science Grade 8

- 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.

# TPS STEAM into Science Grade 8

## Indicator 2.1

Materials are designed to strategically and systematically integrate scientific and engineering practices, recurring themes and concepts, and grade-level content as outlined in the TEKS.

1	Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of grade-level appropriate scientific and engineering practices as outlined in the TEKS.	M
2	Materials provide multiple opportunities to make connections between and within overarching concepts using the recurring themes.	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 and plan and conduct classroom, laboratory, and field investigations and to engage in problem-solving to make connections across disciplines and develop an understanding of science concepts.	M

## 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 Activity Reader Book provides lessons with recurring themes, such as a background story and vocabulary that build upon past units. The scientific and engineering practices are hands-on activities that require scientific equipment and materials to be used. Opportunities for cross-curricular content are intertwined within the investigation.
- In the eighth grade *Learning By Doing STEAM Activity Reader Book*, students are asked to conduct an experiment in which they must build and design a car. They follow the scientific method as they learn about the different forces that act on the object, which is TEKS-aligned.
- In the *Teacher Edition* of the *STEAM Activity Guide*, instructors guide students through TEKS-aligned activities and phenomena. This guidance gives students multiple opportunities to explore, expand, apply, and analyze scientific ideas, theories, and practices.

## TPS STEAM into Science Grade 8

- Each chapter begins with an anchoring phenomenon and then provides students with different types of activities such as class discussions, research, vocabulary, reading comprehension, math, and experiments.

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

- The lesson plan section of the *Teacher Textbook* provides students with multiple opportunities to develop, practice, and demonstrate mastery of grade-level TEKS through activities, guided discussions, and investigations. Newly introduced TEKS list overarching concepts and recurring themes. Concepts and themes are not stated, leaving the terms open to interpretation instead of explicitly explained, defined, and presented. Materials provide examples of the scaffolding of TEKS between units.
- Newly introduced TEKS list overarching concepts and recurring themes. The lessons provide students with opportunities to use models, patterns, and systems to identify the connection between themes and concepts. The materials do not explicitly state the recurring themes and concepts. Recurring themes and concepts are not stated, leaving the terms open to interpretation instead of explicitly explained, defined, and presented.
- In the *Learn By Doing STEAM Activity Reader Book - Grade 8*, the instructor is provided with guidance on how to facilitate a discussion on specific systems. This guidance is followed by an activity that allows students to stamp the connection of the concept and themes. However, this is only within the concept, not providing opportunities for students to use the themes to make connections between 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 8 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.

- In the *STEAM Activity Guide - Teacher Edition*, instructors can find the scientific method. It provides in-depth explanations about the process, which is a recurring theme throughout each activity.
- In the *Teacher Textbook*, the Beginning of Strand chart guides the instructor through TEKS-aligned student learning objectives. There are additional supports for individual student learning. Students who would learn best from a creative approach would do best with arts and crafts activities in the activity guide.
- For example, students differentiate between physiological, structural, and behavioral adaptations in organisms. This lesson builds upon the prior year when students needed to identify what caused a genetic change and provide examples of those adaptations.

# TPS STEAM into Science Grade 8

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

- In the *STEAM Activity Guide - Teacher Edition*, in the Preface section under Problem-Solving, there is an overview that explains how students are taught to problem-solve through the “DAPIC” approach. Instructors are also provided with a chart that outlines student and instructor responsibilities throughout the learning cycle.
- The student’s role is to collect and interpret data, apply the concept, and expand on the concept through reading and global situations.
- In the *Learn by Doing STEAM Activity Reader Book - Grade 8*, instructors are provided with reading strategies to assist students in reading independently and acquiring new academic vocabulary. Students also practice comprehension skills to develop language through listening, speaking, and discussion skills.
- The book recommends that students read the chapter introduction with a partner for additional support. Afterward, there is a reading comprehension activity that asks students to cite key vocabulary and evidence in their responses.
- Activities 3 and 4 have students research hurricanes and typhoons, followed by a class discussion. Instructors have received guidance in the text on how to effectively facilitate discussions with students.

# TPS STEAM into Science Grade 8

## 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

### Partially Meets | Score 2/4

The materials meet some of the criteria for this indicator. Materials sometimes 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 8 Teacher Edition*, the materials provide narrative texts that provide access to phenomena that provide a springboard for learning. However, in the *Teacher Textbook - Grade 8 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 8 Science*, some project-based lessons center around phenomena. Students then design solutions. However, the ideas presented for problems to be solved are not phenomena-inspired ideas. They are problems presented by the teacher.
- The materials provide problems for students to address; however, the problems are often embedded with a specific expected outcome provided by the materials and not created by the

## TPS STEAM into Science Grade 8

students, making the application and performance of engineering practices less than authentic. For example, in Chapter 5 of the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, students are presented with a design engineering challenge to “build a greenhouse that keeps the temperature inside warmer than the outside.” 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 students complete the task because the materials direct them to do so.

- 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 examine the parts of a system and their interdependence such as atoms and molecules, but there are no opportunities to make a connection to other disciplines such as life or earth science in order for students to make connections between systems across lessons.

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

- In the *Teacher Textbook - Grade 8 Science* instructors are provided an overview of how to access students’ prior knowledge and leverage the learning. The lesson plan that discusses SI units has instructors lead students through scaffolded questions to gauge their prior knowledge.
- In the lesson plan there is a section on phenomena and scaffolding information from the previous year’s TEKS. It highlights what standards are built upon and what students should already know.
- In the *Learn by Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, instructors learn that most lessons are dependent on a certain level of student comprehension and knowledge. In order to achieve high levels of student mastery, students must apply scientific principles to problems. Instructors are provided different ways to scaffold student learning based on prior knowledge.
- Students are continuously asked to use the scientific method to solve phenomena and engineering problems. The materials are scaffolded so the previous units’ lessons, themes, and concepts come back up and are used again in a different way.

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. Lesson plans are clearly outlined with activities and investigations that are aligned with the TEKS. The lesson plan also contains objectives, vocabulary words, and a lesson overview to better support student learning. The plans provide guidance in the chapter on how to best serve ELL students by constructing a dual-language version of keywords and definitions.
- In the *Learn by Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, the instructor is provided an outline that shows how and when the scientific method is applied throughout the unit. It is recommended that instructors review the process on a consistent basis.
- Teachers are provided with student learning objectives that are aligned with the TEKS and the anchoring phenomenon. Instructors and students are provided with a scientific method flowchart to aid in learning how to solve the problem in each activity.

# TPS STEAM into Science Grade 8

## 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 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 document titled Horizontal and Vertical Alignment Information states, “As students progress within each grade, the STEAM storybooks are the first level in a series of TPS curricular materials, horizontally aligned to allow the students to engage in a curriculum that builds on knowledge and skills aligned with the Texas Essential Knowledge and Skills.”
- The *Teacher Textbook - Grade 8 Science* covers “The International System Of Units.” The scaffolding shows how the content was studied in previous grade levels. In elementary, students learned how to measure, specifically in grade 5, where students practiced with rulers and other tools. In grade 6 and grade 7, students built off prior knowledge to collect quantitative and qualitative data using some of the same scientific tools in prior grades. Students continue this practice throughout high school. The materials are vertically aligned and designed for students to build and connect their knowledge and skills across grade levels.
- The *Teacher Program Guide - Grades K-8 Science* describes the vertical and horizontal alignment of the program. It references the use of storybooks “to provide an introduction to in a personally relevant manner.” In the Support for Teachers section, it includes a diagram on



## TPS STEAM into Science Grade 8

vertical alignment. It states that “in order for students to show mastery of the content, it begins with establishing a foundation in Kindergarten. As students progress through each grade, the content is reintroduced and expanded, skills are practiced as the levels and complexity are increased.”

- In the *Teacher Textbook - Grade 8 Science*, materials provide a scope and sequence that outlines the order in which students will learn the TEKS. Instructors are also provided guidance on vertical connection to scaffold up or down depending on the needs of the student.

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

- The *Teacher Program Guide - Grades K-8 Science* describes the lesson progression with each resource. The guide explicitly states teachers begin each unit with the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* and then move to the exploration in the *Teacher Textbook - Grade 8 Science*. The *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* introduces all chapters with fictional characters asking and answering questions. Materials intentionally provide content information through the narrative text before students move to exploration. The lesson plans included in the *Teacher Textbook - Grade 8 Science* begin with students engaging with media, discussing what they understood, have seen before, or sparked curiosity. The teacher then begins the instruction, providing steps to complete the investigation if materials offer one.
- In the *Teacher Textbook*, each lesson has a Scaffolding Information section, which provides the teacher with the past, present, and current TEKS to assist with scaffolding the learning for student misconceptions.
- Students investigate scientists who have contributed important science content. They begin by learning about scientists in grades K-2. As the grades progress, students deepen their understanding of these scientists and learn about others who have contributed to our world.
- There is an Essential Content Guide to show the chapters and the TEKS involved in each chapter. In grade 8, the chapters are TEKS-aligned as outlined in the Scope and Sequence. Chapter 3 is associated with the TEKS 13 ABC.
- In the Online Library Teacher support, the Scope and Sequence scaffolds learning by outlining each unit to align with the TEKS. The provided calendar shows intentional sequencing to provide students ample opportunities to demonstrate mastery of the content.
- Assignments within chapters are intentionally sequenced to scaffold learning in a way that allows for deeper understanding. As students work through the Chemical Properties chapter, they are introduced to a story followed by a reading comprehension activity and analysis of the periodic table.

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

- Materials clearly and accurately present grade-level-specific core concepts. In the *Teacher Textbook - Grade 8 Science*, lesson plans consist of a description of the concepts that students will be focusing on. As the lesson progresses, the instructor can build upon the concept and recurring themes. Background information on the current concept is provided. Strategies on how to scaffold recurring themes, such as vocabulary from previous years to the current year, are also provided. For instance, students are expected to know the terms matter, molecule,

## TPS STEAM into Science Grade 8

compound, and mixtures. These were first introduced as early as grade 6, and it is expected students know these words throughout high school.

- Chapter 3 of the *Learn by Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* uses the recurring theme of systems as students differentiate between prokaryotic and eukaryotic cells. Students are expected to know the structure and function of organelles within eukaryotic cells and prokaryotic cells. This lesson builds upon lessons from prior years.
- The section on Scientists and Scientific Investigations builds on the steps in the scientific method and the appropriate use of safety equipment during investigations. Students previously studied this during grades 6 and 7.
- Activities ask students to discuss parts of a system and how the systems depend on the function. They analyze how changing factors can change stability. Students are asked to describe physical and chemical changes by identifying what happens as we eat. This expectation is aligned with what students must be able to identify for mastery of this TEKS.

Mastery requirements of the 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 define student learning boundaries through learning objectives. The mastery requirements are within the boundaries of the main concepts of the grade level. Each chapter ends with true or false questions, a math link connection, and a literacy connection. One learning objective is that students “analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.” The learning objective matches what students are expected to do during the activities at the end of the lesson.
- Materials provide inclusive content. The provision of a minority of content that is outside the boundaries of expected grade level serves a purpose for students of higher than expected ability. It is important to note that the content that is above grade level, is in addition to, not instead of content that is at grade level. For example, in the *Teacher Textbook - Grade 8 Science*, in the 6A TRAD lesson, students engage in the calculation of atomic mass, and it is included in questions for students to complete. The grade 8 science TEKS ask students to “use the periodic table to identify the atoms involved in chemical reactions” in 8.6B but does not require students to calculate atomic mass or discuss subatomic particles. This is an example of where the STEAM program provides grade-aligned materials and materials for below and advanced learners, the latter materials providing extra learning opportunities for advanced learners.
- Materials include mastery requirements that are within the boundaries of the main concepts of the grade level. For example, there is a lesson on the universe. While vocabulary outside of expected boundaries is introduced, this lesson does not require students to understand the scientific principles to a level that is above grade level.
- For example, the grade level content in the *Learn By Doing STEAM Activity Reader Books* Chapter 1 is grade aligned to Grade 8 in that it directly correlates to TEKS 6 A, 6 B, and 6E and includes: (A) explain by modeling how matter is classified as elements, compounds, homogeneous mixtures, or heterogeneous mixtures; (B) use the periodic table to identify the atoms involved in chemical reactions; (E) investigate how mass is conserved in chemical reactions and relate the conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis. For students who are advanced learners, that may be curious about why the elements are arranged in the periodic table. Their arrangement is based upon their atomic number due to the subatomic particles (namely protons), and this is covered in Chapter 1. This is an example of where the materials provide grade-aligned materials and

# TPS STEAM into Science Grade 8

materials for below and advanced learners, the latter materials providing extra learning opportunities for advanced learners.

## Indicator 3.2

Materials provide educative components to support teachers' content and knowledge coherence.

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

## Partial Meets | Score 3/6

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

Materials provide some support to teachers in understanding the horizontal and vertical alignment guiding the development of grade-level content, recurring themes and concepts, and scientific and engineering practices. Materials 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 materials provide some support for teachers in understanding horizontal and vertical alignment. The STEAM into Science - Grade 8 TEKS Correlations document is provided, which outlines where the TEKS appear in the materials; however, this does not provide the teacher with support in understanding horizontal or vertical alignment with how learning progresses during the school year or among school years. The materials provide content examples that are often not in alignment with the vertical alignment of the TEKS, which provides teachers with an incorrect understanding of how grade-level content develops across the grade levels.
- Materials include some guidance that supports teachers in understanding how new learning connects to previous and future learning across grade levels in the Scaffolding Information within the lesson. In the beginning of the Traditional lessons, the Scaffolding Information section in the *Teacher Textbook - Grade 8 Science* 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

## TPS STEAM into Science Grade 8

minimal guiding documents or information that support teachers in understanding how new learning connects to previous and future learning across grade levels.

- The materials indicate that scientific and engineering practices are present in the materials as indicated in the STEAM into Science - Grade 8 TEKS Correlations document as well as in the *Teacher Program Guide - Grades K-8 Science* where all the science TEKS for grades K-8 are listed. These documents do little to support teachers in developing a deeper understanding of the vertical alignment among grade levels.
- The materials provide little teacher support for understanding the horizontal and vertical alignment of the recurring themes and concepts across disciplines, as the TEKS require. For example, there are opportunities for students to examine the parts of a system and their interdependence, such as atoms and molecules, but there are no opportunities to make a connection to how the interdependence within atoms relates to the relationship of the sun's energy, the hydrosphere, and atmosphere to weather and climate outcomes. 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 contain explanations for teachers on grade-level misconceptions to support teachers' subject knowledge. Each lesson plan in the *Teacher Textbook - Grade 8 Science* has a section titled Common Misconceptions. It provides guidance on how to address misconceptions that students encounter when learning new content. For instance, it lists that students believe the information they find on the internet is valid, and it's important to teach students what is valid information and what isn't. These sections are useful to teachers, support their subject knowledge, and allow them to anticipate barriers to student conceptual understanding. Each unit follows the same lesson flow, which allows instructors to catch and address misconceptions. The unit starts with the objective, scaffolding information, a scientific explanation, and common misconceptions, providing a clear example of what is continuously found in each unit.
- In the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, the instructor is prompted to have students restate the instructions to check for understanding. This technique supports the teacher in recognizing the student's barriers to conceptual development.
- The materials provide explanations and examples of science concepts to support the teacher's subject knowledge. For example, the *Teacher Textbook - Grade 8 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.
- Instructor support is provided to help reteach a student's misconception prior to the lab. ELL support is provided by using student vocabulary images and completing the work with a friend. Doing this allows fewer student barriers to learning.

# TPS STEAM into Science Grade 8

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

- Materials provide a purpose or rationale for the instructional design. The *Teacher Program Guide - Grades K-8 Science* in the Support Notes for Teachers states that the content scaffolds as the characters go alongside the diverse students. The *Teacher Program Guide - Grades K-8 Science*, under the Support Notes for Teachers section, gives information about the rationale of how the program was designed. For example, "The STEAM storybook was designed with two key purposes: first to teach science through the prism of STEAM, science, technology, engineering, and math as an approach more relevant to the lives of students."
- Materials explain the intent of the instructional design of the program. The *Teacher Program Guide - Grades K-8 Science* describes the philosophy of science teaching and learning. They explain the publisher's philosophy that we learn best by doing and the importance of scientific understanding for all students. They also explain the science teacher's role in developing critical thinking, problem-solving, and an appreciation of the scientific process. The *Teacher Program Guide - Grades K-8 Science* describes the Teaching Pedagogy - Storytelling and STEAM. The guide references the research on structure strategies and more information on why teaching science through storytelling is important.
- Materials provide an explanation of the goals of the program. For example, 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 the main strategies of the program to cover required TEKS. For example, the subsection on research-based strategies states, "Recent research about STEAM content and storytelling can be read at the end of this guide. It heavily impacted the design of our program, and the first component of the program uses storytelling as its main strategy." The Program Introduction does not reference goals tied to content knowledge, recurring themes and concepts (RTCs), or science and engineering practices (SEPs).
- In the Online Library - Teacher Support, the How to Use the Program explains the intent and purpose of the instructional design of the program, stating that "students must be with lessons that provide full cognitive involvement." Students learn best by doing.
- In the *STEAM Activity Guide - Grade 8 Teacher Edition*, the introduction has a learning cycle and an article about how STEM projects are designed to help students master content. The learning cycle consists of Exploring The Idea, Getting The Idea, Applying The Idea, and then Expanding The Idea.

# TPS STEAM into Science Grade 8

## Indicator 4.1

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

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

## Partial Meets | Score 2/4

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

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

Evidence includes but is not limited to:

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

- Materials support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers. In the *Learn by Doing STEAM Activity Reader Book - Grade 8 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 8 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. Activity 3 in the *Teacher Textbook - Grade 8 Science* requires students to plan and conduct an experimental investigation. Students choose to conduct one of the three provided investigations. Students are

## TPS STEAM into Science Grade 8

to create a table, analyze their data, think about a flow chart or graph that can support their data, answer questions, and reflect on their work.

- Chapter 7, In the *STEAM Activity Guide - Grade 8 Teacher Edition*, provides a lesson named "What's In The Bag." In this investigation, students observe a chemical reaction and record their observations in their journals. The activity allows students to act as chemists by mixing and weighing chemicals.
- In the *Student Journal - Grade 8 Science*, every lesson supports the students' understanding of the concepts by allowing students to answer focus questions, identify the lab safety through the use of a picture, investigate through planning, and conduct descriptive and field investigations on different activities. For example, in "Classroom Safety," students are provided with an image and asked to investigate the classroom. The scenario in the image is that each student is doing something wrong, and therefore it needs to be identified within a table. The investigation part requires the teacher to provide the TEA safety standards and discuss as a class how to keep oneself safe. The students are to then create a poster or graphic organizer by listening to all the safety rules that are agreed on by the class. The activities that follow require students to plan and conduct a descriptive investigation, comparative investigation, and experimental investigation.
- The *Teacher Textbook - Grade 8 Science* has students use a simple engineering design loop to investigate the effect of different materials on the rate of thermal energy transfer. Instructors provide students with questions as students have to think about how to prevent the ice cube from melting, write out the steps they would take/draw a prototype, and adjust their prototype as they learn more.
- 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 often provide grade-level appropriate scientific text, but sometimes include content that is not appropriate for the grade-level. For example, in *The Student Textbook - Grade 8 Science*, in the 6A TRAD lesson, students engage in the calculation of atomic mass and it's included in questions for students to complete. The grade 8 science TEKS ask students to "use the periodic table to identify the atoms involved in chemical reactions," in 8.6B, but does not require students to calculate atomic mass or discuss subatomic particles. The calculation of atomic mass is not a student expectation until high school Chemistry in 6D.
- The materials sometimes provide scientific text that is not appropriate for the grade level. For example, in *The Student Textbook - Grade 8 Science*, in the 9A, 9C - TRAD - Making A Timeline for The Universe lesson, the students are provided darky matter and dark energy as key words for the materials, then explores these terms again in the Math Link activity and student response questions, and later dark energy appears in the Test Practice Questions. While the grade 8 TEKS do expect students to describe the characteristics of the universe, these terms are more

## TPS STEAM into Science Grade 8

appropriate for high school students and are introduced in the high school Astronomy course with TEKS with 13C which expects those students to research and describe “the role of dark matter and dark energy” in the hypotheses regarding the fate of the universe.

- Some scientific text in the materials is not appropriate for the grade-level. For example, in *Learn by Doing STEAM Activity Reader Book - Grade 8 Student Edition*, the materials include a discussion of subatomic structure and the ask students to engage in an activity where they are expected to “describe atoms, including the masses, electrical charges, and locations of protons, neutrons, and electrons. The student expectation involving subatomic structure existed in the 2017 TEKS, but was removed from the new TEKS and now doesn’t appear in the standards until advanced high school courses such as Integrated Physics and Chemistry (6B) or Chemistry (6A, 6C).
- Sometimes the materials include scientific text that is not grade-level appropriate . For example, the *Learn by Doing STEAM Activity Reader Book - Grade 8 Student Edition* includes several pages about topographical maps in the context of the types of maps the National Park Service uses to manage land and water areas. The 2017 TEKS covered the understanding and interpretation of topographic maps, however that student expectation was removed entirely from the new middle school TEKS.

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 *STEAM Activity Guide - Grade 8 Student Edition*, students are given the opportunity to write a description of what happens to a penny and dominoes in the Object at Rest investigation. Writing tasks in the investigation include an explanation about how measuring scales work, a conclusion about the investigation that was conducted consisting of heavy and light objects falling, and questions about the heating and cooling of water and soil.
- Materials provide multiple opportunities for students to communicate thinking on scientific concepts in written and graphic modes. Chapter 2 in the *STEAM Activity Guide - Grade 8 Teacher Edition* has students graph the wheel revolutions and the distance traveled to show patterns. In Chapter 17, students create a data table to show the patterns when comparing weather concepts and communicate their table with other classmates.
- Materials provide multiple opportunities for students to engage in various modes of communication to display understanding. In the *STEAM Arts Project Guide K-12*, there are numerous hands-on projects that are TEKS aligned. “The Infinity That Is Space” lesson has students describe the characteristics of the universe and describe the life cycle of stars and classify stars using the HR diagram. This project allows students to describe the components of the universe and model the HR diagram for classification. Students create a telescope and a snapshot of space with planets and stars. Students will use a handout on the HR diagram to classify stars. Students are then led through a discussion by the instructor.
- The *Student Journal - Grade 8 Science* is set up so each unit has sections on focus questions, investigation, what was learned where students illustrate or model the concept, math, and literacy challenge. For example, one unit reintroduces to students food webs and systems. The activity starts off with a food web/chain and asks about what could make it a stable or unstable system. Afterward, students draw and label a food web, then create a comic strip on an imaginary underwater food web.



# TPS STEAM into Science Grade 8

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. In the *STEAM Activity Guide - Grade 8 Student Edition*, the students act as scientists and engineers to apply their knowledge of phenomena to make sense of concepts. In Chapter 19, students apply the knowledge that they learned about weather and clouds to act as a meteorologist to predict the weather based on the weather fronts and clouds appearing on the satellite.
- Activity 7 in Chapter 8 of the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition* has students identify a problem and then design, build, and test a solution to the problem. Students are expected to use the Engineering and Design Process (EDP). They initially keep a journal for two weeks to input data in which they will then select a problem to solve.
- In the *Student Journal - Grade 8 Science*, students review classroom safety by using an image to identify what is considered dangerous and complete a table to explain why. Students are then asked a question and then investigate like scientists. As students are investigating, they complete data tables and conclude by answering questions and creating a crossword puzzle with questions.

# TPS STEAM into Science Grade 8

## Indicator 5.1

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

1	Materials prompt students to use evidence to support their hypotheses and claims.	M
2	Materials include embedded opportunities to develop and utilize scientific vocabulary in context.	M
3	Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and grade level.	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' content knowledge and skills development 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 prompt students to use evidence concerning text evidence and reading comprehension questions but rarely to support their hypotheses and claims. In the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, Chapter 2, Activity 1, students respond to reading comprehension questions. The materials instruct students to use "text evidence to support the responses where possible." Then later, in Activities 2 and 3, students engage in two scientific investigations where they make hypotheses. Students record their results in both activities and conclude if their data supports the hypothesis.
- The materials prompt students to use evidence to support their hypotheses. Activity 5 of the Chapter 8 lesson in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition* has students design an investigation to test a hypothesis of their choice surrounding the germination of seeds. After engaging in the scientific method, students are asked to "evaluate

## TPS STEAM into Science Grade 8

your experimental design and identify any questions you would like to have answered following your experiments.

- The materials prompt students to use evidence to support their hypotheses or claims. Materials consistently prompt students to use text evidence for Reading Comprehension questions in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*. For nearly all chapters, the instructions to students for Reading Comprehension questions state, “. . . answer the questions using text evidence to support the responses where possible.” In Chapter 4, students observe the effects of acceleration by changing the mass of an object hit by a constant force. Students predict the experiment's outcome, draw and label the experimental equipment, and then calculate the average speed of each car and conclude if their hypothesis was correct.

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

- The material includes embedded opportunities to develop and utilize scientific vocabulary in context. In the STEAM Art Projects section of the *STEAM Activity Guide- Grade 8 Student Edition*, each project lists science vocabulary words that students should focus on while completing the project. The vocabulary is embedded within the steps of the project as opportunities to develop context. In the Infinity That Is Space project, the focus vocabulary words are *telescope*, *universe*, *stars*, and *classification*. In step two, students create a list of components that make up the universe using the key vocabulary words.
- In *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, plenty of evidence in the material includes embedded opportunities for students to develop and utilize vocabulary. For example, Chapter 1, Fire and Water, contains vocabulary embedded in the passage. The students review the vocabulary words to understand their meaning in activity one.
- The *Student Journal - Grade 8 Science* includes several units with opportunities for students to develop and utilize scientific vocabulary. Students write characteristics about four vocabulary words and test their knowledge on the next page by answering four questions. Another example is that students write some characteristics and draw an image on the following terms: *air quality*, *pollutant*, *primary pollutant*, and *secondary pollutant*.

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

- The materials use the word discussion and say, “You should take part in a class discussion” or “Provide details on how and why scientists discuss,” but do not explicitly state the types of conversations students should engage in. The emphasis in the materials is on discourse, with a much lesser focus on the use of argumentation.
- In *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, each chapter has some activities that integrate argumentation and discourse to support student content development. For example, in Chapter 1, Fire and Water, students analyze and discuss observations after an experiment with some prompts provided by the teacher. Examples of those questions include “Was there a difference in the mass of the matches before or after burning compared to the control unburned matches? If the mass was released, where did the rest go?” In Activity 4, students discuss their daily lives and explain chemical reactions they have observed that day. Students are also to discuss how the reaction for photosynthesis demonstrates the law of conservation of mass. While this supports discourse, there is no direct support for students engaging in argumentation.

## TPS STEAM into Science Grade 8

- In the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, the Comprehension Skills section gives the teacher guidance on facilitating discussion. Still, it does not include any evidence or guidance to show the teacher how to incorporate students proving their answers with evidence. In the *Student Textbook - Grade 8 Science*, students have limited opportunities to engage in argumentation and debates. These opportunities are partially integrated throughout the materials concerning the amount of student activities and do not provide student support for engaging in the process of argumentation.

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 for students to write to justify explanations but not to construct arguments grounded in evidence acquired from learning experiences. For example, Chapter 8 of the *STEAM Activity Guide - Grade 8 Student Edition* has students write a conclusion about how mass is related to force, a description of what happens to the penny when it is at rest and a force is applied to an index card and a description of what happens to dominoes when a force is applied. This doesn't ask students to develop an argument or support that argument with evidence.
- In the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, Chapter 6 has several activities that provide some opportunities for students to construct and present written or verbal responses to justify concepts. For example, the Climate Change Research Project has students use scientific evidence to research climate change and address several prompts provided by the instructor. Activity 6, Satellite Images, has students examine the satellite image of Earth and observe what cannot be seen from an aircraft or the ground and discuss it. These are not examples of students constructing arguments using evidence since in these activities, students do not develop arguments before answering discussion questions. Therefore the activities are not at the rigor of argumentation.
- The materials provide some opportunities for students to gather text evidence to answer comprehension questions but not to use evidence to construct arguments. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, students read the Forces of the Universe chapter and answer the questions using text evidence. An example of questions that students answer is, "Why do astronomers use astronomical units and light years? Describe the different galaxy shapes. What is a supercluster?" Students also write a response to a prompt about the life cycle of different stars and describe the HR diagram. When students write the responses, they are not prompted to develop an argument based on evidence.

# TPS STEAM into Science Grade 8

## Indicator 5.2

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

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

### Meets | Score 4/4

The materials meet the criteria for this indicator. Materials 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 guidance on anticipating student responses. For example, in the *Teacher Textbook - Grade 8 Science*, Lesson 6E - TRAD, there is a two-part investigation for physical and chemical changes with questions that follow to elicit student responses. The materials provide possible student responses in red.
- The materials provide some guidance for anticipating student responses. In the *STEAM Activity Guide - Grade 8 Teacher Edition*, Lesson 13, Applying the Idea, the materials state, "Students may suggest a variety of things here, such as the size of cities in the United States or world..."
- The materials provide teacher guidance for anticipating student responses or questioning to deepen student thinking. In the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, the front matter of the materials provides some teacher guidance,
- The materials provide some anticipation of possible students' responses. The materials divide teacher guidance into correct student responses, incorrect student responses, and partially correct student responses. The *Teacher Program Guide - Grades K-8 Science* 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 recommends that students responding incorrectly be provided with "Level 1 assessment questions." The materials state, "A student responds incorrectly - use the Online Library -

## TPS STEAM into Science Grade 8

Assessment tools; choose Level 1 assessment questions for the TEKS being taught.... Determine if there is a misconception and resolve.”

- The materials provide teacher guidance on anticipating student responses and limited guidance on the use of questioning to deepen student thinking. For example, in the *STEAM Activity Guide - Grade 8 Teacher Edition*, Lesson 8, in the Getting the Idea III section, the materials provide teacher questioning to deepen student thinking and anticipate student responses, such as when the materials state, “Students usually ‘buy’ that there are opposite reactions for actions but they may have trouble with the equal part.”

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

- The materials provide teacher guidance on how to scaffold and support students’ development and use of scientific vocabulary in context. The *Teacher Textbook - Grade 8 Science*, Research the Forces That Act Between Water Molecules, and Investigate Capillary Action, provides a list of the vocabulary words.
- The materials provide teacher guidance for supporting vocabulary development. The *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* includes a section early in the materials titled Vocabulary Guidance. This section consists of two sentences, which state, “There is a vocabulary component within each activity section, providing an opportunity to review words and terms introduced in the chapter text. The purpose is to examine the meaning(s) of the words and use them in a discussion.”
- The materials provide teacher guidance on how to scaffold and support students’ development and use of scientific vocabulary in context. The *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* and the *Teacher Textbook - Grade 8 Science* provide scientific vocabulary in student narrative texts and experiences; there is teacher guidance in those components of the materials that allow teachers to scaffold and support vocabulary development. Students either interpret the meaning in the context of the narrative text or learn it during the final activity of each chapter, titled Vocabulary Words and Terms.
- The materials provide some teacher guidance for supporting vocabulary development. In the *STEAM Activity Guide - Grade 8 Teacher Edition*, the beginning of each STEAM Art Project outlines the vocabulary in a section titled Science Vocabulary to Focus On, which provides teachers a starting point.
- The materials provide little teacher guidance on how to support students’ development and use of scientific vocabulary. For example, in the Support Notes for Teachers within the *Teacher Program Guide for Grades K-8 Science*, the materials state, “ Many more straightforward activities requiring little supervision can also be assigned as homework, particularly the vocabulary at the end of the activities section” that are found in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*.

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

- The materials provide teacher guidance on student discourse and supporting students in using evidence to construct written and verbal claims. In the *Teacher Program Guide - Grades K-8 Science*, the Define, Assess, Plan, Implement, and Communicate (DAPIC) process is explained. For the Communication section, the guidance states, “The results are analyzed, conclusions are reached, and the results are shared with others. This takes the form of written or oral reports...”

## TPS STEAM into Science Grade 8

In the *STEAM Activity Guide - Grade 8 Teacher Edition*, Lesson 4, Learning to Communicate, the majority of the time is spent on students doing activities such as drawing straight lines, drawing a cube, drawing a curved surface, sketching in proportion, and using sketches to communicate.

- The materials provide teacher guidance on using evidence to support claims. In the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, the section titled Comprehension Skills provides a bulleted list of activities for teachers to encourage students to “participate in student-led discussion by eliciting and considering suggestions from other group members, taking notes, and identifying points of agreement and disagreement.”
- The materials provide guidance on using evidence to construct claims. In the *STEAM Activity Guide - Grade 8 Teacher Edition*, Lesson 7, What’s in the Bag? in the Expanding the Idea section, the materials state in step 9 that students should “cite evidence for reaction in the cell in Part A,” and also for Part B.
- 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.
- The 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.
- The materials provide teacher guidance on preparing for student discourse. In the *Teacher Textbook - Grade 8 Science*, Lesson 10 - SIAV - Deforestation, students “create a coordinate plane to represent the model.” The lesson has students research different topics related to deforestation in pairs or groups. Then, the materials state that the teacher should “facilitate the sharing of information.” General guidance for student argumentation and discourse comprehension skills is provided. For example, materials state “Speak coherently about the topic under discussion, employing eye contact, speaking rate, volume, enunciation, and the conventions of language to communicate ideas effectively. Listen and generate relevant questions to clarify and deepen understanding, gain information and make pertinent comments. Work collaboratively with others by following agreed-upon rules, norms, and protocols TPS believes that the teacher’s application of the guidance above, together with prompts integrated into the activities, will provide information for the teachers to establish a classroom culture”.

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

- The materials provide support and guidance for teachers in facilitating students finding solutions. In the *STEAM Activity Guide - Grade 8 Teacher Edition*, Lesson 8, the materials provide support and guide teachers in facilitating students in finding solutions and sharing thinking in most of the STEAM experiences.
- The materials provide teacher guidance to engage students’ thinking in various modes of communication throughout the year. For example, the *Assessment Guide - Grade 8 Teacher*

## TPS STEAM into Science Grade 8

*Edition* includes sample responses to “Focus Questions” for the lesson Solving Problems. Specific guidance is provided about communication in the *Teacher Textbook - 5th Grade Science*. It states “Effective science communication is central to education, discussion and scientific argumentation. Not all scientists agree on everything, and when they disagree it is important that they can effectively use data, and current scientific ideas to communicate their reasons for their disagreements. Sometimes scientists must communicate complex ideas to the public. Most members of the public have a lower scientific understanding than a professional scientist, and therefore when communicating with the public it is important to deliver information in a way that can be easily understood. Encourage students to think about what they have learned in today’s lesson and discuss the different ways in which they could communicate what they have learned. You might instruct the class to write a newspaper article, create an educational video, or deliver a presentation. Discuss with students the importance of considering their audience when constructing their presentation. Students may create presentations to deliver to the teacher, each other or their parents/carers. Presentations may be delivered individually or collaboratively”. Misconceptions are also provided.

- The materials provide support and guidance for teachers in helping students find solutions. For example, in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, Chapter 5, Activity 10, students use the engineering design process to design and build a greenhouse. The materials state, “Review the Design Engineering Process with students . . . Remind them that the re-engineering of a design is a natural step taken by engineers worldwide to optimize their designs.” Then, the image of the Design Engineering Process is displayed. The next sentence in the materials states, “When the greenhouses are complete, ask students to test them outside in the Sun.”
- The materials provide support and guidance for teachers in helping students share their thinking. For example, in the *Teacher Textbook - Grade 8 Science*, Lesson 6A - TRAD, students explore capillary action. In the Lesson Adaptations section, the materials state, “Encourage students to create concept maps of what has been discussed. Ensure students understand that such techniques as concept mapping or drawing can help them memorize necessary information.”.



# TPS STEAM into Science Grade 8

## Indicator 6.1

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

1	Materials include a range of diagnostic, formative, and summative assessments to assess student learning in a variety of formats.	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 that include formal and informal opportunities to assess student learning in a variety of formats. Materials assess all student expectations and indicate which student expectations are assessed. 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.

- Materials provide diagnostic, formative, and summative assessment tools. 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.”
- The *Teacher Program Guide - Grades K-8 Science* has a Progress Monitoring section that provides information on the four Benchmark tests included in the program. Materials direct teachers to use the Benchmark 1 test to assess prior knowledge and then use the Benchmark 2 test to assess mastery of taught TEKS. Benchmark 3 test can be administered as an end-of-term test, and Benchmark 4 is the end-of-year test. In this respect, Benchmark tests 1, 2, and 3 can be considered diagnostic and formative assessments, and Benchmark 4 can be considered a summative assessment. Materials provide formative and summative assessments in the Interactive Software Tool and Assessment Generator.
- The Assessment Tools K–8 in the *Online Library* provides instructors with an assessment generator to provide a formal assessment for the students. Teachers select the TEKS, Scientific,

## TPS STEAM into Science Grade 8

and Engineering practice and have options to have multiple choice questions, open-ended questions, or both options.

- Materials provide a range of assessments in the *STEAM Activity Guide - Grade 8 Teacher Edition*. The Chapter 2 assessment in the *STEAM Activity Guide - Grade 8 Teacher Edition* consists of objectives, a problem/task, and requirements for submission. The student assessment is graded based on a grading rubric.
- Materials provide a range of assessments in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*. Chapter 4 is titled Newton's Laws of Motion! In Activity 2, students explore Newton's Second Law by calculating and analyzing how the acceleration of an object is dependent on the net force acting on the object and the mass of the object. In Activity 3, students use spring scales to measure force in Newtons. Students measure force by dragging different books with different masses across a surface. Students write a hypothesis describing what they expect to find and why. These activities include a Discuss & Analysis of Results section where students are involved in asking questions and identifying problems.
- The Assessment Tools K–8 in the *Online Library* provides instructors with an assessment generator to provide a formal assessment for the students. Teachers select the TEKS, Scientific, and Engineering practice and have options to have multiple choice questions, open-ended questions, or both options.

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 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."
- Materials include the Assessment Generator as an online tool for teachers. The Assessment Generator is categorized by grade level, question type, learner level, and TEKS, enabling the teacher to evaluate all student expectations. The online Assessment Generator can create assessments for any grade-level standard. The Benchmark Test tool available to teachers assesses all student expectations and indicates the expectations assessed at the top of each page.
- Chapter 2 in the *STEAM Activity Guide - Grade 8 Teacher Edition* provides the instructor with objectives that align with the task that students must complete for the assessment. The objectives in the chapter consist of putting information from data tables into an appropriate chart or graph, finding a pattern in a set of data, and making inferences from data collected. In the Problem/Task section, students work with the local parent-teacher association (PTA). The PTA has donated funds for the school to order new playground equipment. Students will work to design an investigation to gather useful data to convince the school playground committee to purchase a particular slide design.
- The Infinity That Is Space Project in the *STEAM Activity Guide - Grade 8 Student Edition* gives students the standards for the project and the lesson's purpose.

## TPS STEAM into Science Grade 8

- The Interactive Assessment Tool - Online Test and Quizzes provides questions for each student expectation.
- The *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* has a section that provides instructors a way to assess students formally. Each question is aligned with the TEKS and assesses all student expectations.
- The Pacing Guide in the Online Library - Teacher Support section has a pacing plan with a day-to-day breakdown of each unit to be taught. After each unit, there is time for revision, assessment, and reteach of the concepts. This format allows instructors to assess all student expectations.
- 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."

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

- The Assessment Tool in the *Interactive Assessment Software Tool - Online Test and Quizzes* is aligned to the TEKS that the instructor wants to assess the student on. The instructor has the choice to integrate Scientific Concepts, Science of Engineering Practice, recurring themes, and concepts to assess.
- The *Online Library* has an interactive assessment software tool that integrates Scientific Concepts as well as Scientific and Engineering Practices. Instructors can use the online tests and quizzes to assess students on the different TEKS that are being covered up to 100 attempts.
- The *Online Library - Teacher Support* has a section that includes an assessment matrix that includes each unit and its TEKS. Instructors add their students' names to include notes and scores for the concept. Instructors can further track students' understanding of the recurring themes and concepts.

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

- The materials include assessments that require students to apply knowledge and skills to novel contexts. Specifically, the assessments within the program's *Assessment Guides* are activities separate from the lessons in the other program materials. This structure allows for assessment within the topic of study but in a new context, such as during the study of push and pull with magnets. Then, the *Assessment Guide* provides a performance task skills assessment that requires students to apply knowledge and skills about magnets and push and pull in a performance task skills assessment, which includes a rubric for scoring and summative questions.
- Chapter 2 in the *STEAM Activity Guide - Grade 8 Teacher Edition* provides instructors with objectives that align with the problem/task that the student must complete for the assessment. The objectives in Chapter 2 consist of students putting information from data tables into an appropriate chart or graph, finding a pattern in a set of data, and making inferences from the

## TPS STEAM into Science Grade 8

data collected. The problem that the students are given is to design an investigation to gather useful data to convince the school playground committee to purchase a particular slide design. Students are graded using a grading rubric with criteria aligned with the objectives of the tasks.

- The *Student Journal* has a section in each unit where students test themselves on their knowledge and skills/vocabulary. For example, the unit on acceleration has students calculate the acceleration of an object and other key concepts using their knowledge and skills of Newton's Second Law of Motion.
- The *Student Journal - Grade 8 Science* has a Math and Literacy Challenge where students connect the concepts that are being taught. They can be assessed through the use of knowledge and skills and make a connection with other subjects. For example, as students study Newton's Second Law, they predict what could happen to the acceleration of a car if the mass was doubled, not changed, or applied double the force. Students explain what action-reaction forces are and identify what the reaction force would be in several examples.

# TPS STEAM into Science Grade 8

## Indicator 6.2

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

1	Materials include information and/or resources that provide guidance for evaluating student responses.	M
2	Materials support teachers' analysis of assessment data with guidance and direction to respond to individual students' needs, in all areas of science, based on measures of student progress appropriate for the developmental level.	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 resources for evaluating student responses in most program components. The Chapter 1 assessment in the *STEAM Activity Guide - Teacher Edition* provides the instructor notes on what to look for when grading and elaborates on how to grade the task that the students solve.
- In the Blackline Master K-8, benchmark tests are broken down by the TEKS level. Assessments range from Level One questions up to Level Three. Instructors have the opportunity to leverage different activities based on the assessment to respond to student data. The assessment provides the instructor with the correct answer for multiple-choice questions.
- The appendices in the *Learn By Doing STEAM Activity Reader Book* provide instructors with an essential content guide to evaluate students' responses by aligning the TEKS, concepts, and vocabulary in student responses.
- In the *Learn By Doing STEAM Activity Reader Book - Teacher Edition*, instructors are provided with guidance for questions that can be used in any way for each lesson at the end of the resource material. TEKS and answers can help guide student responses.
- The Teacher Textbook provides instructors with a support section. The Test Yourself section is used to evaluate student mastery. It includes multiple-choice questions, and the correct answer

## TPS STEAM into Science Grade 8

choice is checked for the teacher's knowledge. The What Have You Learned section includes a four-square quadrant, stating, "In each of the quadrants below, write down some characteristics of each one of the vocabulary words you recently learned. Add a picture to help you remember the meaning of the term." The teacher's guide includes the phrase "student answers will vary." Throughout the materials, activities and worksheets include possible student answers.

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 8 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.
  - The Beginning Of Strand in the *Teacher Textbook - Grade 8 Science* provides general direction on how to proceed with responding to student data.
- 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.

## TPS STEAM into Science Grade 8

- The *Assessment Guide - Grade 8 Teacher Edition* offers a range of tools for evaluation and questioning, including multiple-choice and open-ended questions and performance tasks.
- The Graded Assessment Database offers three levels, Below, At, and Above, to support teacher analysis of data.
- The Assessment Matrix lists the knowledge statements for core concepts to support tracking overall data for students.
- In the *Teacher Program Guide - Grades K-8 Science*, the information provided states, “Level 1 learners will require more time and content from STEM and art projects in conjunction with story books.” Level 2 students must follow the original scope and sequence and work on additional projects at home. Level 3 students continue the scope and sequence and can complete the advanced learner content and advanced STEM projects. Benchmark tests determine levels.
- The *Teacher Textbook - Grade 8 Science* uses Beginning of a Strand that directs instructors to determine students' initial understanding using the assessment database. Afterward, the materials direct the instructor to determine the best possible strategy to address student needs.
- The Teacher Support section of the Online Library has a video titled “How to use the [platform] Assessment Generator tool.” These exams are formative and can be utilized throughout the school year. Level One is for students showing a lower level of mastery, Level Two is for students on grade level, and Level Three is for students demonstrating mastery.

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 8 Science*, the *Student Journal - Grade 8 Science*, the *STEAM Activity Guide*, the *Assessment Guide - Grade 8 Student Edition*, and the Intervention Focus Tutorial.
- The *Assessment Guide - Grade 8 Teacher Edition* offers review activities, performance tasks, and reteach assessments to assist teachers with direct instruction for using interventions. Support Matrices provide teachers with guidance on resources to use when supporting students. The *Teacher Textbook - Grade 8 Science* offers general suggestions for supporting students but lacks specific guidance on responding to student data.
- 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.

# TPS STEAM into Science Grade 8

## Indicator 6.3

Assessments are clear and easy to understand.

1	Assessments contain items that are scientifically accurate, avoid bias, and are free from errors.	M
2	Assessment tools use clear pictures and graphics that are developmentally appropriate.	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 8 Teacher Edition*.
  - For example, in Chapter 2 of the *STEAM Activity Guide - Grade 8 Teacher Edition*, the assessment uses objects in the scenario that are familiar to all students, such as the PTA, playground equipment, and a playground slide.

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

- Materials use some clear pictures and graphics that are developmentally appropriate. The assessment in Chapter 2 of the *STEAM Activity Guide - Grade 8 Teacher Edition* contains graphics such as the grading rubric but does not contain any pictures. The grading rubric graphic is developmentally appropriate for students to understand the criteria for the grading process. Test questions in the Assessment Generator provide students with developmentally appropriate images on 24 occasions (out of the 671 test questions) for grade 6. Grades 7 and 8 test questions are similar to grade 6.



## TPS STEAM into Science Grade 8

- Assessment tools in the K-8 Online Library contains limited pictures/images. Questions in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* provide formative and informative assessment questions. The Test Yourself section does not include any graphics in the Teacher or Student Edition.
- The indicator uses the terms pictures and graphics in the plural form. Test questions in the Assessment Generator provide students with developmentally appropriate images on 24 occasions (out of the 671,212 test questions) for grade 6. This indicates that only 3.5% of the questions have pictures or graphics. Grades 7 and 8 test questions are similar to grade 6.
- Each chapter in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* has pictures that are clear and easily understood by the learner. Each image is aligned to the TEKS/concepts that are being presented in the chapter so that the learner is able to make a clear connection. For example, Chapter 1, Fire and Water, has images aligned to the text. The images are clear so that the students can understand the meaning of each term and understand the text. Some images include combustion, the structure of an atom, the modern periodic table of chemical elements, etc.

### 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.
- 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 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 8 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.”
- The Online Library contains guidance videos for using the Assessment Generator tool, including how to store information and reuse questions. The videos provide guidance on how to create assessments by TEKS, skill level, and how to personalize assessments.
- The Assessment Generator gives an overview of each assessment teachers create. Teachers can see sample student answers to help with scoring open-ended responses.

## TPS STEAM into Science Grade 8

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. Teacher guidance presented as Tips for ELL Students and Tips for Response to Intervention (RtI) Support mentions help with reading student-facing text but does not include guidance to provide oral administration 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.

# TPS STEAM into Science Grade 8

## Indicator 7.1

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

1	Materials provide recommended targeted instruction and activities to scaffold learning for students who have not yet achieved grade-level mastery.	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*. Here, 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 Activity Reader Book 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* 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.”

## TPS STEAM into Science Grade 8

- Materials include teacher guidance for scaffolding instruction in the Learning Strategies and Scaffolding sections of unit introductions in the *Teacher Textbook - Grade 8 Science*. This guidance is sometimes generalized for all students and not specific to students with learning gaps. For example, guidance included in Earth and Space states: “Students should first learn that Earth absorbs radiation from the sun, and releases it back to space. It is important that students know that the average temperature on Earth remains constant when these two processes occur at the same time rate.”
- Materials also include a Scaffolding section for each lesson in the *Teacher Textbook - Grade 8 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. Additionally, each chapter in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition* contains bolded sentences that rephrase or provide extra examples or define the concepts. In Chapter 2, Carwash, the rephrases, or extra examples in bold can be found.

Materials provide enrichment activities for all levels of learners.

- Materials provide enrichment activities embedded in the core component *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*. Chapter 4, Newton’s Laws of Motion, includes multiple enrichment activities. Activity 1 requires students to read the story and complete the questions, which is the ELAR extension. Activity 2 has students calculate the acceleration of an object, and they learn how it depends upon the net force and mass of an object. Students use a variety of tools and plot their data. In Activity 3, students use a spring scale to measure the force of four different books and complete four trials for each. Students then plot data on a graph.
- Materials include the STEAM: Real Science Middle School Teacher Edition in the Online Library of resources. This resource includes enrichment lessons that allow students to apply their knowledge and skills of each concept to real-world scenarios through the Engineering Design Process (EDP).

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 lessons within the *Teacher Textbook - Grade 8 Science*. Each teacher-led lesson contains suggested scaffolds under the Support header, giving the teacher suggestions for helping students reach mastery of lesson content. For example, in the Making Informed Decisions lesson, guidance under the Support header states: “Provide students with additional time to review the questions, complete their research and answers. Have students work with another student and have time to compare findings. Often, talking things through with a peer will build confidence.” Throughout the textbook, 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.

## TPS STEAM into Science Grade 8

- Just in time content is provided and detailed in the teacher program guide K-8 which advises the online materials available. In the Teacher Program Guide K- 8, under the Support Notes For Teachers, bullet three discusses how the goal of the program is for students to master all TEKS. If students are having a difficult time with concepts, it gives teachers guidance on how to address the students' needs. If students master the TEKS, guidance is also given on how to allow the student to progress and what level of questions to give the student on assessments.

# TPS STEAM into Science Grade 8

## Indicator 7.2

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

1	Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content.	M
2	Materials consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one).	M
3	Materials consistently support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation.	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 IMaST Learning Cycle Section in the *STEAM Activity Guide - Grade 8 Teacher Edition* provides an overview of Exploring the Idea, Getting the Idea, Applying the Idea, and Expanding the Idea sections. When students explore, the instructor acts as the facilitator. They allow students to test materials, manipulate objects, make observations, and collect data. During the Getting the Idea section, students discuss their findings and experiences during Exploring. The instructor addresses misconceptions in the learning and questions students.
- In the *STEAM Activity Guide - Grade 8 Teacher Edition*, each lesson provides the instructor with an introduction to the lesson and the lesson objectives. In Chapter 1, the introduction provides the instructor with a snippet of what students will be doing in each section of the learning cycle and how to facilitate student learning.
- The online *Teacher Textbook - Grade 8 Science* gives an overview of all the steps the instructor can take for a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content. The suggested steps provided by the text are listed sequentially as follows: *Learn by Doing Activity Reader*, *Student Textbook* (which has a variety of different instructional approaches), *STEAM Activity Guide*, and an assessment.

## TPS STEAM into Science Grade 8

- The scope and sequence outlines each unit with the student learning objective and the key concept that is TEKS aligned. For example, Unit 4, Earth and Space, is where the student describes the characteristics of the universe and the relative scale of its components; the student knows that interactions between Earth, ocean, and weather systems impact climate; the student knows that natural events and human activity can impact global climate. The aligned TEKS: 9ABC, 10ABC, and 11ABC are referenced again in other lessons such as Weather Reporters through the *Learn by Doing STEAM Activity Reader Book*, What's In A Galaxy? in the online *Teacher Textbook - Grade 8 Science*, and What Can We Expect? in the *STEAM Activity Guide - Grade 8 Teacher Edition*.
- Each chapter in *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* provides a variety of instructional approaches to engage students in the mastery of the content. For example, Chapter 4, Newton's Laws of Motion, has a reading section that provides bolded information for vocabulary and keynotes to be used on questions or activities. Activity 1 is reading comprehension, where students read the passage and answer the questions. In Activity 2, students work in a lab to calculate acceleration with different objects and record data through a graph. Activity 3 is a lab to calculate force with spring scales.

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

- In Chapter 1 of the *STEAM Activity Guide - Grade 8 Teacher Edition*, the instructor is given guidance on putting the students into groups based on ability level or making diverse groups with different ability levels. In Chapter 4, Learning to Communicate, students discuss and share their results and conclusions with the whole group.
- In the Online Teacher Support - *Family/Caregiver Guide - Grades K-8 Science*, in Teaching Pedagogy - Storytelling and STEAM<sup>OBJ</sup>, it states that the stories could be read in groups with the instructor or in the home with the caregiver.
- In the *Teacher Textbook*, each activity supports flexible grouping. In Chapter 2, Car Wash, Activity 1 is a one-on-one assignment where students read the chapter and then answer questions. Activity 2 is a small group activity where students work on an experiment that follows the scientific method. Activity 3 is a small group activity where students test materials to determine if they are acidic or basic.
- The Online Library - Interactive Assessment Software tool allows teachers to create assessments that are TEKS-aligned and assist instructors with providing extra support to individual students who are struggling with mastering the content. Instructors can create questions to be assigned to the whole group as a class test to assess content. For example, if a teacher wants to focus on the following TEKS 13C for Grade 8, the ID# is 11719.
- The *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition* starts with students being asked to answer comprehension questions after reading the chapter story. They can do this alone or with a partner. Activity 10 is a succession research project done in a small group that addresses the research question: "Describe the process of succession following a volcanic eruption and fire. Include the timeline and stages. Identify the cause and effect of succession." The whole class discussion is a five-minute presentation where students ask questions to their peers.

## TPS STEAM into Science Grade 8

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

- The materials support multiple types of practices (e.g., modeled, guided, collaborative, independent) but provide limited guidance and structures to achieve effective implementation for all TEKS.
- Chapter 1 In the *STEAM Activity Guide - Grade 8 Teacher Edition* has students work collaboratively in the Exploring the Idea section to complete the focus questions. In the Exploring section, the teacher guides learning by asking probing questions. In Chapter 1, Student Assessment, the students work independently and collaboratively to write a conclusion about their learning.
- Materials partially support modeling. The indicator refers to modeling as the instructor showing students what they should be doing and how. The publisher refers to making models of scientific phenomena compared to showing students how to solve a specific problem (such as calculating speed). The *Teacher Textbook - Grade 8 Science* states that the instructor may choose to demonstrate malleability. Opportunities for teachers to model a skill are not explicitly stated. The *Teacher Textbook - Grade 8 Science* contains opportunities for collaboration, such as helping students decide on questions that can be answered using an experimental investigation.
- Instructors and students are provided context on how to practice modeling a concept when collaboration among students occurs and independent practice, such as answering questions. For example, Chapter 1, Fire and Water, supports independent practice, provides guidance from the instructor, allows collaborative practice for students as they work in groups, and allows some teacher modeling.
- Unit 2, Matter and Energy, guides the instructor to use the *Learn By Doing STEAM Activity Reader Book - Grade 8 Student Edition*, Chapter 1, Fire and Water, to support multiple types of practices. The chapter's activities are aligned to support independent practice, such as Activity 1, a reading comprehension activity. Materials support guided practice, which tells the instructor to wear safety gear and go over the safe use of a hot plate. Materials support collaborative practice where students work in small groups on an experiment and discuss results. Students also research a STEM career and discuss it in their investigation.
- The *Teacher Textbook - Grade 8 Science* begins with the instructor explaining the periodic table and how it's organized. Students then look inside each box to identify each part of the periodic table and identify what it represents. Students are then guided through information about metals, nonmetals, and metalloids. They color each section based on what it represents. Afterward, they answer questions in the student exercise about the periodic table (this can be done by themselves or with a partner). The test practice questions are an individual activity.

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

- In the *STEAM Activity Guide - Grade 8 Student Edition*, diversity is shown in the images in the textbook based on race, age, and gender. The textbook includes images of men and women and people of different ethnic backgrounds.
- In the *STEAM Activity Guide - Grade 8 Student Edition*, the images represent a diversity of places, such as the International Space Station, a gym, a theme park, and a chemical plant.
- In *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*, multiple images represent a diversity of communities. For example, Chapter 1, Fire and Water, has an image representing children and teachers of diverse backgrounds and disabilities who are working together to think of a good chemistry project. Chapter 4, Newton's Law of Motion, shows



## TPS STEAM into Science Grade 8

students of diverse backgrounds on a rollercoaster demonstrating the First Law of Motion. Chapter 5, Forces of the Universe, has an image of an astronaut, and below the caption reads “Rosa's Dream,” which represents how a little girl wishes to one day be able to see the stars from space.

- The cover of the *Teacher Program Guide - Grades K-8 Science* has a diverse group of people engaged in science and a diverse classroom of students engaged in learning.

# TPS STEAM into Science Grade 8

## Indicator 7.3

Materials include listening, speaking, reading, and writing support 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 8 Science*. For example, in the Grade 8 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 for supporting emergent bilingual students. For example, the Grade 8 lesson, Investigating Photosynthesis, advises teachers: "Some students may require further assistance in order to understand the instructions they are required to follow." The Matter and Energy lesson lists two several lesson adaptations under the ESL/Reinforcement heading: The exercise works well as a whole-class exercise. Students can study element symbols and then quiz one another. Encourage students to use their

## TPS STEAM into Science Grade 8

prior knowledge and experiences to understand meanings in English. Encourage students to read aloud, if able, or to describe the pictures from the book. Teachers should monitor oral language production and encourage students to use self-corrective techniques, or other techniques and resources, to aid their learning. While these suggestions guide teachers toward providing linguistic accommodations, the guidance is not commensurate with various levels of English language proficiency as defined by the ELPS.

- Materials embed teacher guidance for incorporating literacy strategies in science instruction in the *Learn By Doing STEAM Activity Reader Book - Grade 8 Teacher Edition*; however, this program component lacks guidance for linguistic accommodations within teacher guidance for activities, science vocabulary, and narrative text. For example, materials present reading comprehension and vocabulary activities without guidance for linguistic accommodations commensurate with the English language proficiency levels defined in the ELPS.

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 8 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 Scientific and Engineering Practices, states: "Use the Spanish glossary cards to assist relevant students." The Spanish glossary cards are available to teachers in the Online Library - Blackline Master - K-8 Science.
- Materials encourage the use of students' first language in suggestions under the Tips for ELL Students header in the *STEAM Arts Project Guide K-12 Grade 8*. For example, the Teacher Text states, "If possible, have students work in collaborative groups where students share the same languages, and ideally, one student is advanced in English. Use visual and tactile models to illustrate elements of each activity and focus on the keywords. You can have students create a journal of words in their first language and in English."

# TPS STEAM into Science Grade 8

## Indicator 7.4

Materials provide guidance on fostering connections between home and school.

1	Materials provide information to be shared with students and caregivers about the design of the program.	M
2	Materials provide information to be shared with caregivers for how they can help reinforce student learning and development.	M
3	Materials include information to guide teacher communications with caregivers.	M

### Meets | Score 2/2

The materials meet the criteria for this indicator. Materials provide guidance on fostering connections between home and school.

Materials provide information to be shared with students and caregivers about the design of the program. Materials provide information to be shared with caregivers for how they can help reinforce student learning and development. Materials include information to guide teacher communications with caregivers.

Evidence includes but is not limited to:

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

- 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 8 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.

## TPS STEAM into Science Grade 8

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

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

- Materials include the *Family/Caregiver Guide - Grades K-8 Science*, a resource designed to facilitate family support for learning. This document references the free digital access that materials provide for families to reinforce student learning.
- The *Family/Caregiver Guide - Grades K-8 Science* provides resources and strategies for caregivers to help reinforce student learning and development, stating that “Parents/caregivers can help enforce some of the requirements of the TEKS at home. The work you can complete with your children will vary between assisting students studying new TEKS content and explaining how it applies to home life and practical assistance with safety measures.” It further suggests “Family Visits” to reinforce student learning and development. The list contains five suggestions: Texas Park, Texas Coast Wetlands, Texas Fishery, Texas Wildlife Reserve, and Gulf Coast Beach. The materials direct parents and caregivers to “ask your family member what studies they have completed that relate to these locations and discuss their thoughts and reviews.”
- Materials also provide the NEST Family Videos to support caregivers with science content knowledge. Each workbook is provided with a Parent and Teacher guide that has activities and coloring pages that students can complete at home with their parents.
- The *Teacher Textbook - Grade 8 Science* lessons also include an At Home section with specific suggestions for home reinforcement.

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

## **TPS STEAM into Science Grade 8**

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 8

## 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 in the course materials.	M
2	Materials provide clear teacher guidance for facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts.	M
3	Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.	M

### Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include year-long plans with some 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 8 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. A pacing calendar view is also available that shows the breakdown of units daily.
- An alternate RTI scope and sequence is provided and aligned with the STEAM Storybooks and other instructor-facing materials.

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

- The materials provide year-long tools that indicate where teachers may find opportunities for facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts. For example, the materials provide a grade-level scope and sequence document outlining the instances where core concepts, SEPs, and RTS are present throughout program components. Additionally, the *Learn by Doing STEAM Activity Reader Book - Grade 8 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 8 Science* includes a Teacher Guided Questions to Inquiry section for each lesson. These questions provide opportunities for

## TPS STEAM into Science Grade 8

facilitating student-made connections across core concepts, scientific and engineering practices, and recurring themes and concepts. For example, materials provide the following for the lesson Transmitting frequencies: “Under what conditions did your system work well?” and “What conditions did you test, and what were your results?” In the Warm and Cold Air masses lesson, questions include: “What patterns do you notice in your isotherm map?” and “Can you think of any possible explanations for these patterns?” One question for the Deforestation lesson asks, “What are the consequences of using up a renewable resource?” For each set of questions there is guidance in the Additional Hints section. 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 8 Teacher Edition* provides support for facilitating student-made connections across systems, one of the grade-level recurring themes and concepts in the TEKS. Under the header “Systems,” materials guide teachers as follows: “Introduce the concept of systems to the students before commencing reading the book. Explain that a system is a sum of its parts, where the parts are interconnected in the system. Provide examples of simple and complex systems (software system, vacuum cleaner, robot) and then mind map a few to identify their parts.” Materials then highlight examples relevant to chapter contents as guidance for student discussion.

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.
- The TEKS 1-5 Content Guide shows some evidence of the materials spiraling knowledge and skills in various program components across the year. The evidence does indicate where specific science and engineering practices are revisited throughout the year that are relevant to the activities included for that concept.
- Materials show spiraling of cross-content connections. The materials provide intentional practice and spiraling of previously taught knowledge and skills from earlier lessons/grade levels and the current lesson’s science knowledge and skills. Materials state: “If students accurately answer either or both questions then once the textbook content that follows has been completed it is highly likely that the science content will have been mastered. Teachers assign level 2 questions for TEKS taught and record results onto the assessment matrix”. Materials then explain what to do if students have not yet mastered content.
- Materials include project-based lessons incorporating multiple standards within an investigation, including some previously taught.



# TPS STEAM into Science Grade 8

## Indicator 8.2

Materials include classroom implementation support for teachers and administrators.

1	Materials provide teacher guidance and recommendations for use of all materials, including text, embedded technology, enrichment activities, research-based instructional strategies, and scaffolds to support and enhance student learning.	M
2	Materials include standards correlations, including cross-content standards, that explain the standards within the context of the grade level.	M
3	Materials include a comprehensive list of all equipment and supplies needed to support instructional activities.	M
4	Materials include guidance for safety practices, including the grade-appropriate use of safety equipment during investigations.	M

### Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include classroom implementation support for teachers and administrators.

Materials provide teacher guidance and recommendations for 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.

- The *Teacher Textbook - Grade 8 Science* includes guidance and recommendations for phenomenon-based learning, embedded technology, background information, and lesson extensions to support and enhance student learning. Instructors can also access a support line via phone and email for additional support and questions regarding the materials.
- Materials provide overview documents to support teachers in understanding how to use all materials. In the *Assessment Guide Teacher Edition*, teachers can reference lesson plans with a sequence and pacing for lesson implementation that includes activity directions and discussion topics. Materials include directions for how to implement the lesson plan, including using given scaffolds and enrichment activities for the lesson. Materials also include a Teacher Support component within the Online Library of the learning platform. Supports include detailed plans for the delivery of lessons.
- The materials include guidance and recommendations in the *Teacher Program Guide – Grades K–8 Science*, with a program introduction, program components, TEKS, LEPS, and a navigation guide to online resources. Within the guide, materials provide an explanation of the different components and how they are used. This resource also includes teacher guidance for getting

## TPS STEAM into Science Grade 8

started with the material with embedded technology. For example, materials explain the use of materials such as online libraries, *Teacher Textbook* lessons, *Student Textbook* activities, and assessment tools.

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 8 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 8 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 8 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 8* 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*.
- The *Learn by Doing STEAM Activity Reader Book - Grade 8 Teacher Edition* includes cross-content standards for ELA and math, such as comprehension of increasingly complex text, text-based discussions, and data analysis. Materials also include lessons and projects requiring research skills in the Online Library. These projects involve real-world scenarios correlating science learning with technology, engineering, art, and math skills.

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

- Materials include a comprehensive list of materials students need for activities and investigations in the *Teacher Textbook - Grade 8 Science*. Teachers can view a list of materials needed for specific lessons in the different investigations. The materials detail supplies for use in hands-on exploration in grade 8.
- The *STEAM Activity Guide - Grade 8 Teacher Edition* lists materials needed for each lesson portion. This component begins with a phenomenon that requires students to use scientific equipment and supplies to connect prior knowledge with a new concept.
- The RTI Scope and Sequence includes a materials list for each activity considered hands-on or a lab experience.
- Materials provide information in the Online Library for refilling material kits.
- Materials provide a STEAM into Science Grade 8 Textbook Kitting List, which alphabetically lists all required materials to complete activities and investigations.

## TPS STEAM into Science Grade 8

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

- In the *Teacher Textbook - Grade 8 Science*, the laboratory safety section outlines how to create safety assessment plans with students and states instructors should do this before each investigation. Each investigation section reminds teachers to ensure safety standards are being followed and notes that safety standards must be aligned with local standards and the TEA safety standards.
- The Scientific Method lesson in the *STEAM Activity Guide* includes safety tips for hands-on learning and general safety. Instructors are provided with checklists for general safety practices and usage of safety equipment.
- Materials include guidance for safety practices in the *Scientific, Investigation, and Reasoning Handbook – Grade 8*. The first lesson, “Working Safely and Responsibly,” reviews how to behave safely in science lessons.

# TPS STEAM into Science Grade 8

## Indicator 8.3

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

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

### Meets | Score 2/2

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

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

Evidence includes but is not limited to:

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

- The *Teacher Textbook* provides a detailed scope and sequence with time stamps for the entire unit. In addition, lesson plans list time stamps for the daily lesson. The average lesson time ranges from twenty to fifty minutes.
- Instructors have access to a pacing plan that extends throughout the year. In addition to this pacing plan, there is an RTI-based scope and sequence with time stamps throughout the activity.

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

- The *Teacher Textbook* includes an overview of content and skills to be introduced to students. Scientific concepts, scientific practices, and engineering help instructors build background knowledge and use that to provide students with guided-based inquiries during investigations that include but are not limited to STEM projects and other forms of assessments. In the *Teacher Textbook*, lesson plans are in place to implement the sequence of the content.
- The content guide for the grade level provides the chapter with corresponding TEKS. The chapters follow a developmental progression, building student content knowledge that follows the scope and sequence.
- The RTI scope and sequence provides specific details on the duration of the units, lessons, and content pacing, as well as sequential chapters. All materials are TEKS-aligned.
- Instructors have access to a flow chart that aids in accessing students' prior knowledge and best practices for the implementation to address gaps in student knowledge. Instructors are also provided with concise, student-friendly objectives and outlines of tasks that can be leveraged to fill in those gaps.

# TPS STEAM into Science Grade 8

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

- The *Teacher Textbook* provides an instructional calendar that outlines the TEKS and skills addressed in each unit. The projected time to cover all instructional material is one hundred and fifty days.
- The pacing plan provides instructors with two weeks' worth of flex days for assessments and reteach options. The RTI lesson plans allow flexibility for reteaching with the instructor choosing which activity aligns best with student needs.

# TPS STEAM into Science Grade 8

## Indicator 9.1

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

1	Materials include an appropriate amount of white space and a design that supports and does not distract from student learning.	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 8 Science* is text-heavy, lacking adequate white space and other design features to support student learning. Lessons in the textbook often contain one to two pages of closely spaced text without graphic or text features. Chapters and lessons within the textbook lack clear titles that would help students navigate the various topics, activities, and sections.
  - For example, the traditional lesson, *Reproduction in the Fruit Fly 1* in the *Student Textbook - Grade 8 Science* begins with three single-spaced pages of background information under the heading *The Science*. The clipart embedded in the text lacks design features, such as labels, captions, and special formatting that would grab student attention and support learning.
  - For example, each chapter in the *Learn By Doing STEAM Activity Reader Book - Grade 8 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.

## TPS STEAM into Science Grade 8

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 the *Student Textbook - Grade 8 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, in the *Student Textbook - Grade 8 Science*, materials include a clipart image of a motocross racer wearing a spiky helmet surrounded by blue lines to indicate motion. The text on the page, titled Student Exercise, discusses the Big Bang Theory and the Doppler effect in the context of the origins of the universe. While the text references a moving car, it does not reference a motorcycle.

Materials include digital components that are free of technical errors.

- The materials include digital components that are free of technical errors. Teacher digital materials are free of spelling, grammar, and punctuation errors.
  - For example, the *STEAM Activity Guide - Grade 8 Teacher Edition* and *Teacher Textbook - Grade 8 Science* includes activities free of inaccurate content materials or information. The materials are also free of wrong answers to questions asked.
  - For example, the Online Assessment Tools K- 8th Science- Assessment Generator is free of technical errors.
  - For example, the Scientists section in the Online Library provides information on different scientists and their accomplishments. The resources have fact sheets that students can use when researching that scientist. This digital component is free of technical errors.

# TPS STEAM into Science Grade 8

## Indicator 9.2

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

1	Materials integrate digital technology and tools that support student learning and engagement.	Yes
2	Materials integrate digital technology in ways that support student engagement with 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 assessment, 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.



## TPS STEAM into Science Grade 8

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 8

## Indicator 9.3

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

1	Digital technology and online components are developmentally appropriate for the grade level and align with the scope and approach to science knowledge and skills progression.	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 – Grade 8 Teacher Edition*. 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 8

- 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.