TPS STEAM into Physics

TPS STEAM into Physics Executive Summary

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

TEKS Student %	TEKS Teacher %	ELPS Student %	ELPS Teacher %
100%	100%	100%	100%

Section 2. Instructional Anchor

- The materials are designed to strategically and systematically integrate scientific and engineering practices, recurring themes and concepts, and grade-level content as outlined in the TEKS.
- The materials anchor the learning in phenomena and problems as the key lever for driving learning and student mastery of disciplinary knowledge and skills.

Section 3. Knowledge Coherence

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

Section 4. Productive Struggle

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

Section 5. Evidence-Based Reasoning and Communicating

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

Section 6. Progress Monitoring

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

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Section 7. Supports for All Learners

- The materials provide some guidance on fostering connections between home and school.
- The materials include some listening, reading, writing, and speaking supports to help Emergent Bilinguals meet grade-level science content expectations.
- The materials include some research-based instructional methods that appeal to a variety of learning interests and needs.
- The materials include 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 classroom implementation support for teachers and administrators.
- The materials provide implementation guidance to meet variability in program design and scheduling.

Section 9. Design Features

- The visual design of materials is mostly clear and easy to understand.
- The materials are somewhat designed to engage and support student learning with the integration of digital technology.
- The digital technology or online components somewhat developmentally and grade-level appropriate and provide support for learning.

Section 10. Additional Information

- The publisher submitted the technology, price, professional learning, and additional language supports.

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Indicator 2.1

Materials are designed to strategically and systematically integrate scientific and engineering practices and course-level content as outlined in the TEKS.

1	Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices as outlined in the TEKS.	M
2	Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level or course as outlined in the TEKS.	M
3	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 develop an understanding of science concepts.	M

Meets | Score 4/4

The materials meet the criteria for this indicator. Materials are designed to strategically and systematically integrate scientific and engineering practices and course-level content as outlined in the TEKS.

Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices as outlined in the TEKS. Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level or course as outlined in the TEKS. 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 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 appropriate scientific and engineering practices as outlined in the TEKS.

- The materials include the Online Library - High School Engineering located on the main menu page of the materials. This CeMast Engineering Student book contains a problem where teams will design an electric vehicle to be used on land. The materials state that "all students are supposed to be able to do the things on this list" and proceeds to list eight science and engineering practices including asking questions and defining problems and developing and using models.
- The Expository Text provided for students at the beginning of all lessons includes thought-provoking questions that build upon their prior knowledge, facilitating the understanding of the current lesson. For example, in Core Area 2, the Expository Text for Coulomb's Law introduces students to Van der Graff generators and the basics of Coulomb's Law and eventually asks questions to use mathematical and computational thinking such as "How much weaker will the force be if the distance between two objects is increased by a factor of 10?"
- The materials offer numerous opportunities for students to develop scientific and engineering practices that align with their grade level. For instance, the CeMast Engineering activities guide students through comprehensive engineering tasks that span approximately 20 weeks.

Additionally, the high school engineering online library and STEM projects provide further resources and projects for students to engage in hands-on engineering experiences.

Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level or course as outlined in the TEKS.

- Materials provide opportunities for students to develop, practice, and demonstrate mastery of appropriate scientific and engineering practices outlined in the TEKS via various hands-on-digital, writing, and research activities throughout the units. The embedded Expository Text sections within the student textbook effectively explain various methods for solving analytical physics problems. For example, the unit for Newton's Second Law in the Student Textbook tasks students to explore an expository text with guided questions and research that employs students to use an image of an accelerating car develop an understanding that "Newton's second law tells us that the size of this acceleration will be directly proportional to the force applied to it, and inversely proportional to the mass of the car."
- The Teacher's Guide and/or lesson notes included in the materials provide comprehensive explanations, descriptions, and connections between the science and engineering practices (SEPs) and the development of conceptual understanding. The Table of Contents guides students through the analysis of motion, beginning with an exploration of motion in one dimension and then progressing to motion in two dimensions. Each new topic is accompanied by a detailed description of the TEKS, SEPs, misconceptions, and prior skills to support teachers in delivering effective instruction.
- The High School Physics Slides included in this resource contain interactive questions designed to assess students' mastery of the covered material. These questions offer an opportunity for students to demonstrate their understanding. For instance, in the High School Physics TEKS 5 slides, there are specific questions that require students to solve problems related to position, velocity, and acceleration. Slide 6 offers students the following scenario and tasks "A car sets off from home and accelerates at a constant rate to 30m/s over a period of 5 seconds. The car remains at this velocity for 10 seconds before decelerating back to rest over a period of 6 seconds. Draw a graph to describe the motion of this journey. Use the graph to calculate the total distance traveled. Use the graph to calculate the acceleration for each section of the journey."

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 develop an understanding of science concepts.

- The investigations in this resource involve the analysis of pre-populated data to explore various physical events. The lab activities are structured with scripted procedures; in the unit aligned with TEKS 5a, students participate in a hands-on laboratory activity where they plan and conduct an experiment to examine the velocity of an object using photogates. This lab allows students to actively engage in scientific inquiry and apply their understanding of velocity concepts.
- The materials provide various opportunities for students to actively engage in problem-solving through the use of CeMast projects, student focus exercises, starter/hooks, and extension work. These resources are available for each new topic, ensuring that students have ample opportunities to apply their knowledge and skills in meaningful ways.

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- The SMSC (Social, Moral, Spiritual, and Cultural) section and Career Opportunities section in the teacher edition lessons provide thought-provoking questions and real-life connections to help students develop their critical thinking skills and make connections to the world around them.
- The teacher and student textbooks begin with a look into TEKS 1A, which describes the importance of students learning to ask questions and observe what they see in the phenomena-related activities. Two of the learning objectives for this lesson include “ask appropriate questions that can be addressed in a practical classroom laboratory setting” and “prepare investigations that lead to the collection of data addressed at solving the problem.”

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Indicator 2.2

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

1	Materials embed phenomena and problems across lessons to support students in constructing, building, and developing knowledge through authentic application and performance of scientific and engineering practices and course-level content as outlined in the TEKS.	M
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

Meets | Score 4/4

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

Materials incorporate real-world phenomena and problems throughout the lessons to help students construct, develop, and apply knowledge using authentic scientific and engineering practices aligned with the TEKS. Materials intentionally draw upon 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 and course-level content as outlined in the TEKS.

- The materials integrate phenomena and problems throughout the lessons to facilitate the authentic application and demonstration of scientific and engineering practices aligned with the grade-level content specified in the TEKS. For instance, the *CeMast Engineering Prof Development Teacher Book* includes engineering projects that promote the application of scientific and engineering practices. While the textbook provides a description of simple harmonic motion, it lacks real-world application examples. However, CeMast offers an extensive engineering project spanning twenty weeks, which incorporates the six-step engineering design process, allowing students to engage in a more comprehensive and authentic engineering experience.
- The materials include starter/hook questions that are based on everyday phenomena, fostering student engagement. For instance, in the unit addressing TEKS 5C in the teacher textbook, students are prompted to determine the time it would take for a ball to fall to the ground, encouraging them to utilize their prior knowledge to formulate a hypothesis. As the lesson progresses, students learn how to calculate the expected time for the ball to fall and subsequently verify their calculations through practical experimentation using an actual ball.

- The materials offer real-life problems in Lessons 5B through 5E, leveraging students' existing understanding of motion to facilitate authentic applications. These problems are integrated into the sections at the conclusion of each lesson, focusing on concepts such as time, displacement, velocity, speed, and acceleration.

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

- The materials offer support for both teachers and students in addressing situations where explanations based on prior knowledge may be insufficient or incomplete. To assist teachers in identifying areas where students might possess misconceptions or incomplete understanding, each unit includes a dedicated section called "Common Misconceptions." This valuable resource enables teachers to assess and address any inaccuracies or gaps in students' prior knowledge. Additionally, the materials include a "Prior Knowledge" section at the beginning of each new topic, providing a clear overview of the foundational knowledge necessary for successful comprehension and application of the upcoming content.
- In the unit that addresses TEKS 5d, students have the opportunity to apply their prior knowledge of acceleration in a novel context, specifically exploring its application in circular and projectile motion. This unit builds upon their existing understanding of acceleration and expands their knowledge by examining how it operates in different scenarios.
- The materials begin with a prior knowledge section that serves as a reminder for students about previously covered lessons and topics, such as scalar and vector quantities. This reminder helps to establish a foundation and build upon the concepts learned in previous lessons, such as speed and velocity.

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

- The materials include a teacher background section, which provides educators with additional information and context related to the topics being taught. This section supports teachers in having a solid understanding of the content they will be teaching. Furthermore, the materials outline expected information attainment for students, setting clear expectations for what students should learn and achieve. In addition, the materials offer explicit activities that help students visualize and engage with the topics, promoting a deeper understanding of the concepts being covered.
- The Teacher Textbook for each unit includes a set of learning objectives that clearly outline the expected student outcomes by the end of the unit. These learning objectives serve as a guide for teachers, providing a clear understanding of the specific skills and knowledge students should be able to demonstrate.
- The materials effectively identify the student learning goals associated with each phenomenon or engineering problem presented throughout the course of study. These learning goals are clearly outlined through the listing of objectives, prior knowledge, and misconceptions, providing a comprehensive understanding of the intended outcomes for students.

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Indicator 3.1

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

1	Materials are designed for students to build and connect their knowledge and skills within and across units.	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 course-specific core concepts and science and engineering practices.	PM
4	Mastery requirements of the materials are within the boundaries of the main concepts of the course.	M

Partial Meets | Score 3/6

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

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

Evidence includes but is not limited to:

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

- The course materials exhibit a gradual increase in complexity, establishing connections between new learning and previously acquired knowledge, as well as future learning goals, both within and across units. As an illustration, the unit on motion progressively introduces more intricate concepts and calculations, starting from changes in position and advancing to two-dimensional motion. In Unit 7D+E, the teacher background section establishes a connection between momentum and collision concepts and kinetic and potential energy. Within the Student Textbook, the Prior Knowledge section for Lesson 7D on Impulse spirals to Lesson 5E on Newton's First Law of Inertia. It draws real-world connections to various topics, such as riding in a car or a rocket launching, to reinforce understanding.
- In the kinematics section of the book, there is a gradual increase in complexity as the learner progresses through the different TEKS related to the subject. It starts with the basic concept of determining displacement and velocity, then advances to the understanding of acceleration, and finally delves into the topic of projectile motion. Each TEKS builds upon the previous one, adding incrementally more complexity to the overall concept.
- In the Student Textbook, the Learning Activities section presents a progressive increase in complexity for students, transitioning from topics like displacement/time graphs in linear motion to the exploration of harmonic motion. Additionally, in the work and energy unit, the materials provide a comprehensive overview that includes the TEKS covered, objectives (such as defining work and power), skills developed (such as numeracy and calculating the area under a

graph), and the prerequisite knowledge required (such as defining and analyzing motion in one dimension using equations and understanding concepts like distance and displacement) for effective comprehension of the work and energy concepts.

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

- In Unit 8, students engage in the observation of reflection and refraction of light, utilizing their observations to construct a mathematical relationship that explains these phenomena. To activate their prior knowledge, Unit 8E+F presents a task where students are challenged to create a spectrum using a prism and a light source. Furthermore, students enhance their understanding by reading about the dispersion of light in the accompanying expository text.
- The materials follow a progression that starts with concrete representations, moves to representational representations, and then culminates in abstract reasoning to enhance conceptual understanding. To illustrate this, the concept of work is initially introduced through a picture depicting a boy pushing a box. Subsequently, the materials explore the connection between work and circular motion before delving into the topic of work on an incline. This sequential approach allows for the activation and development of prior knowledge, paving the way for a deeper conceptual understanding. Moreover, the materials include math and descriptions pertaining to work done in a piston, further enriching the learning experience.
- In the Student Textbook, the vocabulary related to scalar and vector quantities is gradually introduced through specific examples, such as distance and displacement, as well as speed and velocity. This scaffolded approach helps students develop a clear understanding of these concepts. Additionally, in the Learning Activities section of the textbook, students are paired up to compare the characteristics of transverse and longitudinal waves.
- The lesson addressing TEKS 8A serves as an introduction to harmonic motion, providing students with foundational knowledge about different types of waves and their formation. As students progress to TEKS 8B, they build upon this knowledge by focusing on determining the characteristics of various types of waves. These units are designed to progressively build and expand upon the knowledge acquired in previous units, ensuring a continuous and coherent learning experience.

Materials clearly and accurately present course-specific core concepts and science and engineering practices.

- The materials provide an accurate presentation of core concepts specific to the course. However, the use of uncommon language and symbols in the text, not typically found in American physics texts, can cause confusion. For instance, in the unit on linear motion, the rate of change on a graph is referred to as the gradient instead of the slope. Additionally, the unit on kinematics utilizes unconventional symbols for quantities, further adding to potential confusion.
- The materials clearly establish specific learning targets for each course, outlined at the beginning of each topic, comprehensively addressing all the TEKS, and providing dedicated sections on efficient coverage of each one. Lesson 6D+E mentions procedures in Student Task 2 that could be considered a lab, yet do not explicitly state the skills that are gained or which lab materials are needed to complete the task.
- The materials present grade-specific core concepts and science and engineering practices (SEPs). For example, The Horizontal Alignment Excel document lists all the SEPs and the page numbers the skill can be found; however, the SEPs are not explicitly integrated into the lessons

consistently throughout the teacher or student textbook. For example, the document provides evidence of SEPs for TEKS 1–4 and does not include integration with TEKS 5–9, which are the science concepts. Summaries, definitions, and examples illustrating the SEPs are described at the beginning of both the teacher and student books, but they are not mentioned in the corresponding lessons.

- The CeMast Engineering online library provides opportunities for students to engage in the engineering design processes; however, the lessons included in this library are outside of the physics text and scope and sequence. The materials do not include a corollary to assist teachers in choosing which lessons in the physics student book would align with which lessons in the CeMast library.

Mastery requirements of the materials are within the boundaries of the main concepts of the course.

- The scope and sequence provide a clear outline of the covered TEKS and their order. Additionally, each section dedicated to TEKS in this resource starts with a set of Learning Objectives that clearly outline the material to be covered in each unit. These objectives help guide students' understanding and achievement of the topic. For example, in the Work and Power unit, students are expected to recall the statements of the work-energy theorem, create energy diagrams to represent changes and apply the law of conservation of energy for transformation and efficiency calculations.
- In Chapter 8G, the objective is explicitly stated as “describing and predicting image formation through reflection from a plane mirror and refraction through a thin convex lens.” The lesson then establishes the conceptual boundaries of this objective by engaging students in activities where they predict the image formation for objects at various distances, test their predictions, and describe the observed results.
- The resource offers multiple activities within each TEKS section to facilitate the learning of concepts. Furthermore, the Assessment Generator accompanying this material includes questions that align with the expected level of mastery for students. It also includes more challenging and less challenging questions, allowing teachers to accurately assess students' understanding of the material and determine their progress.

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Indicator 3.2

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

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

Partial Meets | Score 3/6

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

Materials somewhat support teachers in understanding the vertical alignment of course-appropriate prior knowledge and skills guiding the development of course-level content and scientific and engineering practices. Materials contain explanations and examples of science concepts, including course-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 vertical alignment of course-appropriate prior knowledge and skills guiding the development of course-level content and scientific and engineering practices.

- The majority of units in the materials provide information on previously covered physics TEKS and include a teacher background section. For instance, Lesson 3A specifies TEKS 2A as prior knowledge for that unit. The materials include a vertical alignment document spreadsheet; however, the materials lack clear connections to previous grade-level knowledge and skills for all TEKS, as well as future applications of the skills acquired in the lesson. Additionally, there is a lack of guiding documents that outline the progression of content and concepts, including their increasing depth and complexity throughout the course.
- There is a lack of description regarding the skills covered at the end of the previous grade. Specifically, in high school courses, the materials cover content-level concepts within the academic year. However, there is no list provided to illustrate the progression or the increase in the depth and complexity of skills that students should be able to demonstrate by the end of the year.
- The units do not include a vertical alignment resource specifically for engineering practices. Consequently, it is the responsibility of the teacher to assess and determine the student's current understanding and progress in relation to engineering practices. The teacher should then make necessary adjustments to the materials to address any gaps in knowledge and ensure that students acquire the required understanding of engineering practices.

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Materials contain explanations and examples of science concepts, including course-level misconceptions to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS.

- The materials provide teachers with background information to support their instruction. In Unit 5G+H, there is a detailed explanation and examples of Newton's Third Law and action-reaction forces. One example explores the action-reaction forces acting on a water skier, while another example focuses on the action-reaction forces between the Earth and the Moon. These explanations and examples are tailored to adult-level understanding but remain within the scope of the current course. This information enables teachers to enhance their own knowledge of the subject matter while ensuring that the materials are accessible and comprehensible to students.
- The teacher's textbook includes a comprehensive teacher background section at the beginning of each unit and most lessons, offering detailed explanations of the science concepts covered. Additionally, within the teacher's guide for every unit, there are specific sections that offer strategies and support for students who may require Response to Intervention (RTI), English Language Learner/English as a Second Language (ELL/ESL), or Special Education accommodations and assistance.

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

- The Teacher Program Guide provides an explanation of the overall design of the program, while each unit in the Teacher Guide details the specific delivery approach intended for that unit, offering a clear purpose and rationale for their structure and design. Furthermore, the materials outline the course's objective in the program guide's section on the philosophy of science.
- The Teacher Program Guide contains comprehensive instructions on how to effectively utilize all the information presented in the student and teacher textbooks. The section titled “How To Use The Program” in the teacher support section provides clear guidelines and step-by-step instructions on how to navigate and implement the program. t begins with Step 1, which is the “Learn by Doing STEAM Activity Book.”
- The materials provide an overview of the intent and purpose of the instructional design within the “High School Sciences Teacher Program Guide.” The guide includes a program introduction that contains the material’s “philosophy of science teaching and learning” as well as a section detailing “research-based strategies” and the included components within the program.
- The materials provide a “Family/Caregiver Guide - High School” that explains the intent and purpose of the instructional design of the program. Again, a program introduction that includes the material’s “philosophy of science teaching and learning and research-based strategies” is provided.

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Indicator 4.1

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

1	Materials consistently support students' meaningful sensemaking through reading, writing, thinking, and acting as scientists and engineers.	M
2	Materials provide multiple opportunities for students to engage with course-level appropriate scientific texts to gather evidence and develop an understanding of concepts.	M
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

Meets | Score 4/4

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

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

- The materials highlight specific sensemaking behaviors. For example, the authors of the book emphasize the importance of metacognition and support it by scaffolding the lessons and tasks throughout the curriculum. To facilitate student reflection and engagement, a student journal is provided that aligns with the tasks in the student textbook.
- The materials offer numerous opportunities for students to engage in reading, writing, thinking, and acting as scientists. The majority of the TEKS units incorporate resources for students to read and experiments that promote critical thinking and scientific engagement.
- The materials offer students the opportunity to explore life without electricity, fostering an understanding of the importance of generators, transformers, and motors. A clear learning goal is provided, emphasizing the ability to articulate the role of these components.

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

- The materials include various activities, including pre-reading and vocabulary exercises, to assist students in developing a comprehensive understanding of the concepts. In Unit 5E, the unit commences with a starter activity led by the teacher, fostering a discussion on forces and acceleration. During this discussion, vocabulary development, such as the term “acceleration,” is emphasized. Task 1 further enhances students' conceptual vocabulary by introducing the term “terminal velocity.” Additionally, Task 2 involves expository reading that delves deeper into these concepts.
- The materials offer opportunities for students to actively engage with scientific texts through various activities, including pre-reading and vocabulary exercises, aimed at fostering a comprehensive understanding of the concepts. For instance, in the work/energy section, students are introduced to lesson keywords and questions to facilitate their learning. Additionally, the student focus exercise prompts students to collaboratively work through the provided questions with a peer, encouraging discussion and deeper comprehension.
- The majority of the units feature dedicated text sections that allow students to engage in reading activities to acquire information related to the materials being covered. For example, in the unit for TEKS 4C, there are provided links to multiple sources that offer grade-level appropriate scientific texts for students to access.
- The materials provide opportunities for students to investigate generators, motors, and transformers by engaging with relevant scientific texts on electrical and magnetic forces. These texts are accompanied by photos, diagrams, and drawings that depict the application of electrical and magnetic forces in everyday life. Students are prompted to examine a photo of a generator, motor, or transformer and analyze and describe the electrical and magnetic forces and fields involved.

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.

- The materials offer students numerous chances to effectively communicate their understanding of scientific concepts through written and graphic modes. Students are prompted to create graphic organizers and write essays to articulate their ideas. In Unit 6A's expository text, students are reminded to maintain their graphic organizers in their student journals for reference. Task 4 specifically requires students to write a paragraph comparing the equations of electric and gravitational force.
- The materials provide opportunities in the work/energy section for students to engage in collaborative activities, such as answering questions with a peer and creating a graphic organizer using the information presented by scientists. The student textbook in the work/energy section specifically mentions two types of graphic organizers for students to utilize. Throughout various TEKS units, graphic organizers are provided to support students in actively engaging with the material.
- The materials guide students to create graphic organizers as a strategy to enhance their ability to answer questions both quantitatively and qualitatively. This practice is consistently integrated into the beginning of each lesson, preparing students to respond effectively to the questions posed in the Student Task section.

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

- The materials provide authentic engagement and opportunities for productive struggle, allowing students to act as practitioners. In Unit 6B, students are tasked with designing, constructing, and evaluating a generator. Also, in the student textbook, the homework section for Lessons 6B and C states, “There are several free online instructional videos on how students can construct their own aluminum foil electroscopes using everyday equipment. Students should watch some of the videos online and create their own design on paper.”
- The CeMast project provides opportunities for authentic student engagement and perseverance of concepts through productive struggle, allowing students to act as scientists and engineers.
- The materials feature a range of substantial projects that provide students with opportunities to engage in the engineering design process. These projects are designed to challenge students, encouraging them to persevere and problem-solve as they navigate through the content. For example, instructions for practical lab activities are provided in the online slides that accompany each lesson. For example, in Lesson 5D, slides 9 and 10 provide student instructions for how to calculate the horizontal speed that a ball bearing will leave a table.

Materials provide opportunities to act as scientists. For example, in Core Area 2, students predict how electrical devices perform, observe how electrical devices can perform under specific controlled instances, and evaluate how their views match their predictions through calculations or the Student Task. Additionally, after each investigation, in the plenary, students are asked questions such as “What question are you trying to answer/problem are you trying to solve?” and “What would you improve on if you were to repeat the investigation?”

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Indicator 5.1

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

1	Materials prompt students to use evidence to support their hypotheses and claims.	M
2	Materials include embedded opportunities to develop and utilize scientific vocabulary in context.	M
3	Materials integrate argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and course.	M
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.	M

Meets | Score 4/4

The materials meet the criteria for the indicator. Materials 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 argumentation and discourse throughout to support students' development of content knowledge and skills as appropriate for the concept and course. 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.

Evidence includes but is not limited to:

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

- The materials provide opportunities for students to develop how to use evidence to support their hypotheses and claims. In Lesson 5E, the Starter/Hook section of Learning Activities allows students to formulate hypotheses prior to the Teacher providing the solution. The Student Task enhances this process by engaging students in pairs or small groups to solve a problem within the unit. In TEKS Section 3a, there is a discussion on the historical practices of scientists conducting experiments, emphasizing the selection and significance of evidence. It highlights the importance of using evidence in scientific inquiry.
- The materials prompt students to utilize evidence when supporting their hypotheses and claims. For example, in Unit 3B+C, the student tasks focus on claims and evidence. Task 4 specifically emphasizes the use of evidence to support claims. Students prepare presentations and engage in debates, ensuring they have sufficient evidence to substantiate their claims. For instance, while teaching TEKS 1E and 1F, students engage in various activities and respond to questions such as, "Does the conclusion you draw align with scientific ideas, principles, and theories?"

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

- In Unit 6B+C, numerous electrical concepts are demonstrated, followed by activities like notetaking, using graphic organizers, and engaging in discussions. For instance, in Student Task 7, following the demonstration of electric charge and electric field concepts, students are required to create a graphic organizer that includes terms such as motors, generators, electromagnets, and transformers.
- The materials provide experiences with new concepts, followed by opportunities to use the vocabulary presented. For example, at the start of each new topic, the vocabulary words are listed along with their definitions. When presenting TEKS 5A, velocity is defined as "speed in a given direction," and acceleration is described as "the rate of change of velocity." The motion of an ant is then depicted using pictures and eventually represented in graphs.
- Each TEKS unit includes a set of Lesson Key Words, which comprises essential vocabulary words that students need to grasp. These words are provided at the beginning of each section to facilitate students in locating and comprehending key ideas. At the beginning of Lesson 5E, students are provided with a Key Vocabulary section where students are directed to explain the vocabulary on a leaflet or poster.

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

- The materials address scientific argumentation in Unit 3B+C, Tasks 3 & 4. The student task is an opportunity for students to develop how to engage in argumentation. For example, students choose from three topics: eliminating newspapers, e-cigarettes, and taxing junk food to reduce obesity. Students research their chosen topic and present an argument for or against that topic.
- In the lesson for TEKS 3B and 3C, the focus is on fostering research and communication skills. For example, in Task 3, students are engaged in organizing a debate, conducting research on the topic, and delivering presentations to the class.
- When students are taught TEKS 4A, the lesson evaluates and critiques scientific claims by using empirical evidence, logical reasoning, and observational testing. For example, the students are given the problem (Student Task 1) of how to increase the speed of a race car to research and develop the skills needed for argumentation and discourse.
- Materials provide for students to engage in active discourse. For example, in the Student Focus Activity for TEKS 8C, students engage in reading and subsequent discussions with their peers about the material they have just read. Additionally, in TEKS 5F, students are directed to explain net forces to their parents/guardians in order to explain and describe net forces to their classmates.

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 opportunities for students to support their explanations of phenomena. For instance, after investigating the relationship between frequency alterations in a ripple tank and the amplitude of water waves, students are prompted to justify their responses and evaluate if their conclusions align with scientific ideas, principles, and theories.
- The materials provide opportunities to develop their written and verbal arguments throughout lessons. For example, the enrichment activity for TEKS 5D involves students researching a winter

Olympic sport and examining how Newton's Second Law is demonstrated in that sport. Students are then required to create a presentation on the topic and present their findings. Additionally, in the TEKS 7B lesson's Student Task 5 and Plenary of the Mechanical Energy, students are assigned the task of evaluating their investigation and reflecting on potential improvements of launching a pendulum and cannonball straight up, respectively.

TPS STEAM into Physics

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 provide teacher 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 teachers with possible student responses to questions and tasks that support students during lessons and investigations. For example, in Unit 8C, which addresses TEKS 8C related to waves, there is a description of typical student misconceptions about waves. The section explains that students may incorrectly believe that counting the peaks of a wave indicates the number of wavelengths, but they should be guided towards a different technique involving a pencil.
- Materials provide the following additional key questions in the TEKS 7B lesson for the teacher to deepen students' learning: "Where is potential energy the greatest? Where is kinetic energy the greatest? What are the energy changes as the pendulum swings?"
- The resource includes a section called "Teacher Background" within the various TEKS sections. This section ensures that the teacher is knowledgeable about the important material for the unit. When covering TEKS 8D and students are drawing ray diagrams, all diagrams provide clear, step-by-step worked examples. There is no assumption a student will be able to rearrange and apply equations or convert units correctly. The expository texts predict problems in this area and provide template answers, with each step explained, so students can follow along.

TPS STEAM into Physics

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

- The materials provide embedded support for the teacher in how to scaffold students' development of scientific vocabulary related to the concepts being taught. In Unit 1B, which addresses TEKS 1B regarding types of scientific investigations, the entire unit guides students in progressively developing and utilizing the vocabulary associated with these investigations, starting from basic definitions to actually conducting them. Additionally, in TEKS 7A for the lesson Work and Power, prior to reading the text, the following vocabulary words and definitions are discussed: work done, power, work-energy theorem, and system.
- Each TEKS unit includes a section called "Prior Knowledge," which outlines the knowledge that students should have acquired before beginning the unit. For instance, in Unit 8G, the materials inform the teacher that students should have already learned the material from Unit 8D before starting the current unit. This information includes the vocabulary reflection, refraction, diffraction, interference, standing wave, the Doppler effect, polarization, and superposition.
- The Teacher Textbook provides guidance for what is expected to be learned. For instance, Section 5F, Newton's Laws and Forces, particularly Student Task 1, provides the teacher with an explanation of how to rearrange the equation F=ma to solve problems using given data to assist in teaching basic algebra.

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 support to prepare for student discourse. Each unit includes a Teacher Background section, providing teachers with an opportunity to prepare for student discourse. For instance, in Unit 3A, which focuses on TEKS 3A: Develop explanations..., the Teacher Background section includes an explanation of scientific ideas and how to effectively utilize them.
- The materials provide steps for establishing norms for class discussions, including when covering TEKS 3C (engaging respectfully in scientific argumentation). These steps offer suggestions for effective communication, such as avoiding talking down to others, refraining from shouting or being overly aggressive, and various other guidelines to promote respectful and constructive discussions.
- The resource offers several opportunities, through Key Questions, for students to practice constructing written and verbal claims using evidence. For example, in TEKS 5G, a key question asks, "Why does gravitational attraction support Newton's 3rd law?" and TEKS 7A Work, Power, and Energy Intro provides for students to explain work with particular questions: "What does it mean by doing work? How to determine the work done on a spring?" and "How to determine if work is done on or by the system?"

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

- The materials provide teacher support and guidance to engage students' thinking in various modes of communication throughout the course. In Unit 1G, which addresses TEKS 1G: Develop and use models..., there are several examples of various communication modes. For instance, in Student Task 1, there is a class discussion about types of scientific models. In Task 3, students are required to create a scientific model on a chosen topic and communicate the strengths of

the model using a table. The Plenary in TEKS 1G focuses on refining students' solutions by having them share their solutions with fellow students and receive feedback on how to improve them.

- The materials provide teacher support for facilitating the sharing of students' finding solutions. The materials provide feedback tips and examples that teachers can utilize to support students. For instance, after reading a text on forces, the materials suggest placing students in groups and having them summarize the reading, ask each other questions, and take notes. Then, the materials direct the teacher to reconvene the whole group, ask and answer questions, and check for inaccuracies.
- The materials recommend the teacher create a plan to address any inaccuracies or knowledge gaps. For example, in TEKS 5C Kinematics, the materials include a student focus exercise where students are required to explain the concepts of Speed, Velocity, and Acceleration to their peers by relating them to everyday life examples.

TPS STEAM into Physics

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

Meets | Score 2/2

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

Materials include a range of diagnostic, formative, and summative assessments to assess student learning in a variety of formats. Materials assess all student expectations over the breadth of the course and indicate which student expectations are being assessed in each assessment. Materials include assessments that integrate scientific concepts and science and engineering practices. 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 include a range of diagnostic, formative, and summative assessments that include formal and informal opportunities to assess student learning in a variety of formats. For example, in Unit C1, there is a plenary activity where students are prompted to write about the nature of light. This activity follows the student tasks that covered the topic, serving as a formative assessment.
- Materials include diagnostic assessments for providing teachers with information to monitor progress and identify learning gains in a variety of formats. For example, TEKS 8E focuses on the application of the emission spectrum; the teacher's textbook includes key questions to assess students' understanding of the topic. These questions aim to gauge their knowledge and include prompts such as “How does a prism create a spectrum of light?” and “Which color has the longest wavelength?”
- The materials include an assessment generator in the Online Library Physics tab. The generator allows the user to create formative or summative assessments by Core Area. For example, for Core Area 4 Waves, the user has the option to select the standard, level of question (Below, At, Above), and the question format (multiple choice, open-ended, or both).
- Materials provide for formative assessments in both multiple-choice and open-ended questions, i.e., Core 1 Analyzing Motion “Acceleration is a scalar quantity?...An object has a mass 0.6 kg and experiences an acceleration of 12m/s^2. What is the force experienced?” etc.

TPS STEAM into Physics

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

- Materials assess all student expectations and indicate which student expectations are assessed. For example, the online assessment generator list is categorized by Core Area and contains questions covering all of the physics TEKS. For example, Core Area 3, Energy, contains questions from TEKS 7A, 7B, 7C, 7D, and 7E.
- The materials assess all student expectations, as outlined in the TEKS, by the course. The materials contain a cohesive scope and sequence that provides a clear overview of the content to be taught. The teacher and student textbooks present the TEKS at the beginning of each new topic.
- The book's chapters are organized according to the TEKS they cover. Each TEKS or group of TEKS has its own dedicated section featuring a specific number of associated questions and activities. For example, TEKS 8A is accompanied by seven student activities and five associated questions.
- Materials provide both the TEKS correlation for each assessment item and the answer keys for every assessment, i.e., Core 1–6 questions in the Assessment Generator align with TEKS 5–9 or Motion-Quantum Phenomenon.

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

- Materials include assessments that integrate scientific concepts and science and engineering practices. For example, in Unit 6D+E, there is a project that requires students to apply their understanding of circuits by constructing, testing, and measuring circuits.
- The materials include assessments that require students to integrate scientific knowledge and science and engineering practices appropriate to the student expectation being assessed. For example, when covering TEKS 7E (conservation of momentum), students are provided with materials to construct a Newton's cradle, which serves as a model for demonstrating the concept of conservation of momentum during an inelastic collision.
- In the activities addressing TEKS 7D and 7E, students utilize their knowledge of the scientific concept of momentum and engineering practices to construct and improve a device that demonstrates the conservation of momentum.
- The materials include assessments that prompt students to integrate scientific knowledge and science and engineering practices relevant to the specific student expectation being assessed. For example, an assessment question may ask: “At the point of zero displacement, a simple pendulum with a mass of 0.1kg has a velocity of 20m/s. How much gravitational potential energy will the pendulum have gained when it reaches the point of maximum displacement?”

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

- Multiple assessment methods are available to evaluate students' application of knowledge and skills in novel contexts in the Student Tasks, Homework, and Extension Activities. For example, Unit 6A includes an extension activity where students use their knowledge to find the electric force between two people who have lost electrons.
- Also, in Unit 6B+C, students must apply their knowledge to create an electroscope and explain its operation.
- Materials provide informal assessments in the lesson for TEKS 5F Net Forces. On slide 12, students are asked to construct a free-body diagram for the cup given in the image. They are asked to use Newton’s Second Law to calculate the acceleration of the cup for several situations.

TPS STEAM into Physics

- The materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. For example, when covering TEKS 6C (describe conservation of charge), students use their knowledge of electricity and magnetism to design, test, evaluate and refine a simple electric generator.
- The CeMast Engineering section includes another assessment that requires students to apply knowledge and skills to a new phenomenon or problem. The students are given the task of designing an electric vehicle to be used on land. The students must have prior knowledge of velocity, acceleration, forces, and other physics concepts before accomplishing this task.

TPS STEAM into Physics

Indicator 6.2

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

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

Partial Meets | Score 1/2

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

Materials include some information and/or resources that provide guidance for evaluating student responses. Materials do not 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 some relevant information for teachers to use when planning instruction, intervention, and extension. Materials provide some resources and teacher guidance on how to leverage different activities to respond to student data.

Evidence includes but is not limited to:

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

- The Teacher Program Guide includes information about assessment and its implementation. However, it does not address the interpretation of student responses. The Teacher Guide references the following: Learn by Doing, STEAM art project guide, Assessment Guide, Teacher Textbook introduction, and misconceptions addressed in the teacher textbook. However, Learn by Doing consists of a set of K-8 materials and no other materials are included in the guidance for the teacher to evaluate student responses other than right or wrong. Similarly, the STEAM art project guide, the student report card found under the link to an assessment matrix, the Teacher textbook, and the program guide do not provide guidance for evaluating student responses about physics TEKS. The program does include possible misconceptions, and there are correct answers for the test but no rubrics, scoring guides, or other evaluative tools.
- Materials include follow-up suggestions for formative assessments in the Teacher's Guide, provide examples of acceptable answers for evaluating student responses, and include suggested teacher actions to address student learning gaps in lessons and units. For example, addressing the misconceptions found in the student responses and having examples of problems solved before assigning independent practice was evident. However, materials do not include information that guides teachers in evaluating student responses.
- The TEKS units, such as TEKS 6D and 6E, provide background information for the teacher in the teacher textbook. This information equips the teacher with an understanding of the essential

content that should be reflected in the student responses. For example, the Teacher Background section gives definitions for key vocabulary (voltage, current, resistance, etc.), a diagram and explanation of a series circuit with a closed loop, rules for a series circuit, and finally, a diagram and explanation of a closed circuit.
- Materials do not include complete information that guides teachers in evaluating student responses, i.e., an answer key is provided for the assessment generator questions; however, it does not provide information on how much each question weighs for marking purposes or which type of questions should be used. Nor does it provide explanations for why an answer is the correct response.

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 do not provide guidance documents and resources to support teachers' analysis of assessment data. The assessment generator does not include a data analysis ability that supports the teacher's analysis of assessment data.
- The videos showcasing the assessment tools do not demonstrate any specific tools that are designed to address student needs after an assessment has been completed.
- Materials do not support teachers' analysis of assessment data. The assessments are designed separately for each TEK rather than offering assessments that can be taken together to evaluate mastery of multiple TEKs simultaneously.

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

- The materials provide some assessment tools that yield relevant information for planning instruction, intervention, and extension. For example, the publisher rubric tool asserts that the online assessment generator produces such data; however, no available method to extract the data from the generator is included in the materials.
- Materials provide some suggestions for teachers to consider regarding the potential need for whole class review or reteaching as lessons provide for extensions within lessons. For example, in Newton's Second Law of Motion, an example of a free-body diagram is given as an extension for the general lesson: "Draw a free body diagram to represent the forces acting upon the car and calculate the frictional forces preventing the car from rolling down the hill." However, the teacher materials do help the teacher to determine when the extension or reteach is necessary.
- The videos showcasing the assessment tools do not demonstrate any specific tools that can be utilized after an assessment has been completed for instructional planning, intervention, or extension purposes.
- The information gathered from the assessment tools does not help teachers when planning core science instruction. Materials do not include self-reflection questions for teachers to use after analyzing and interpreting data.

TPS STEAM into Physics

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

- Materials provide resources on how to leverage different activities to respond to student data in the How to Help RTI Students section. For example, in Core Area 2, Lesson 1, Coulomb's Law, it states, "Discuss the answer. If the response is accurate, move on to Level 2 questions for these same TEKS. If the answer is partially correct, then discuss the element that is either misstated or missing. Move onto Level 2 but ask the original Level 1 question a day later and ensure the answer is accurate."
- Materials related to Newton's Second Law in the RTI section are provided for students that struggle with mathematical content: "Use the Algebra 1 STEM projects or Algebra 1 textbook and assign relevant content for further study."
- Materials provide limited student resources for teachers to use in responding to performance data. The Intervention Focus Tutorial only covers work, energy, forces, and momentum and uses the same text and graphics from the student textbook. Best practices mandate when mastery is not reached, reteaching should be a different method. Teachers can use this limited tutorial for reteaching concepts.
- Materials provided do not address student data directly, i.e., there are no guidance documents provided for how to use the data taken from assessments or group students based on the content mastery. The Assessment Generator does provide the ability to see the answer choices of each question to calculate the percentage of multiple-choice questions, but a guide is not provided for open-ended questions that may be partially correct. The teacher program guide does include general instructions for the use of different resources to respond to student data. There is also no evidence that the assessment tool includes guidance for specific interventions besides what is included in the videos.
- The videos provided showcase the assessment tools; however, they do not demonstrate any specific tools that can be employed after an assessment to effectively leverage different activities based on student data.

TPS STEAM into Physics

Indicator 6.3

Assessments are clear and easy to understand.

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

Partial Meets | Score 1/2

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

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

Evidence includes but is not limited to:

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

- Assessments contain some items that are scientifically accurate, avoid bias, and are not free from errors. For example, in the test bank in Core 3, question #1 contains an error, as it provides additional information for answer choices. Question 1 includes “e)” without any additional information following the selection as an answer choice.
- Assessments contain some items for the grade level or course that are free from errors. For example, a question from TEKS 5C is, “A car is traveling at 12m/s. If the car accelerates for 7s at a rate of 3m/s2, what is the final velocity of the car? Use the equation v = u + at to help you.” All nine questions were error-free.
- Materials have some questions without errors; however, there are questions that have technical errors. For example, Core 4 question Database ID 122 question 3 says, “An electromagnetic wave has a frequency of XHZ. What is the frequency of an electromagnetic wave with double the wavelength.” One of the answer choices has just units without a magnitude, “A) XHz.”

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

- Materials provide clear images for Core 5 questions, but the images are only present for the below-level questions. Assessment tools do not use clear pictures and graphics that are developmentally appropriate. Assessment questions over TEKS 9 (Quantum Phenomena) contain no pictures, graphics, or diagrams for level or above level materials.

- Materials provide a clear image for Core 1 questions, but there are no images for Core 3 questions. For instance, Core 1 database ID 151 Question 28 provides an image of a graph of a velocity over time image that has three clear points, yet there are no images for Core 3 questions.
- Materials provide questions that have clear images. Specifically, images are present for Core 4 questions but not Core 2 questions. For example, Core 4 question database ID 1447 Question 32 has an image of a transverse wave that is easily read, yet no Core 2 questions have images.

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

- Materials provide an answer key but do not provide answers that are slightly different from the answer key. For example, for Core 1 Database ID 7 Question 2 “Velocity is a scalar quantity? Is this correct? Explain Why?” provides a correct answer “Velocity is a vector quantity because it has a magnitude and a direction. Scalar quantities only have magnitudes with no assessment for the multiple points needed.”
- The materials provide moderately detailed information to support the teacher's understanding of assessment tools and scoring procedures. Each question provides immediate feedback to the student regarding correctness. Although a percentage is given at the end of the assessment, some questions require hand grading by the teacher.
- There was insufficient guidance on the administration of assessments. The material lacks teacher guidance for scoring and analyzing student responses from the assessment generator tool. For example, the materials do not address guidance for student open-ended responses in the form of a scale or key points in order to grade responses that are partially correct.

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

- Materials do not include guidance to offer accommodations for assessment tools that allow students to demonstrate mastery of knowledge and skills aligned to learning goals. There are multiple levels of test questions to support struggling learners, but there are no instructions or guidance provided for their effective utilization. For example, after the teacher selects the TEKS to assess, the assessment generator allows the teacher to choose “Below,” “At,” or “Above” for each Core Area.
- Materials do not provide accommodations for assessment tools to cater to students of all abilities in demonstrating mastery of learning goals. For example, there is no text-to-speech feature on the web-based assessment platform, which would allow students to hover over the text using a speech symbol cursor and have it converted into digital speech to be read aloud to them.

Materials provide guidance for how to use the assessment tool in the Online Library – Teacher support - How To Use the Assessment Generator Tool. A video explains how to use the assessment tool, store information, and create questions by TEKS and skill level; however, the materials do not offer guidance on how to provide questions with fewer answer choices, with text-to-speech, with speech-to-text, or with closed captioning.

TPS STEAM into Physics

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 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.	PM

Partial Meets | Score 1/2

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

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

Evidence includes but is not limited to:

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

- The Teacher Text incorporates an Enrichment Activity for ALL Students section in each unit, providing additional opportunities for students to delve deeper into the content. In Unit 7B, there is a specific activity that encourages students to take on the role of a journalist and articulate the process of calculating kinetic energy and potential energy.
- The materials provide guidance for scaffolding instruction and differentiating activities to address areas in which students may need additional support to achieve mastery. Each topic is accompanied by targeted recommendations for assisting SPED, ELL, and RTI students, conveniently located at the end of the chapter in the teacher textbook. For example, in the work/energy section, the Teacher Edition suggests that ELL students can benefit from creating dual language vocabulary cards. Furthermore, the materials also provide a Misconception section and a Vocabulary section devoted to ELLs.
- The resource offers guidance on implementing scaffolding activities to support students who have not yet attained mastery of the material. The TEKS units are designed with a progression of activities that build upon one another.

Materials provide enrichment activities for all levels of learners.

- The Teacher Text features an Enrichment Activity section designed to engage all students in each unit. In Unit 7B, there is an activity that encourages students to take on the role of a journalist and explain the calculation of kinetic energy and potential energy.
- The materials offer enrichment activities that accommodate learner variability. In the teacher textbook, there are specific enrichment activities provided. For example, in the work/energy

section, one of the enrichment activities is to “select a system of your choice and model the work done.”

- Each of the TEKS units includes a section titled Enrichment Activity for All Students, which provides an enrichment activity without differentiation for students at different levels. The materials also provide an enrichment section in general for students without further differentiation.

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

- The materials provide online resources, such as iMaST STEM Projects, which could be accessed on demand by students; however, there is no clear teacher guidance for how or when these materials should be assigned to the student. The STEM Projects are not integrated into the lesson content, and the materials do not include guidance for other online resources that might provide a deeper understanding of the subject matter within each lesson to support just-in-time learning.
- The materials include the HS Teacher Support Section with an online library containing nine videos over nine different TEKS that contain practice problems. Students can watch these at their own pace, pausing and re-reviewing when needed. For example, lesson 7e contains instructions on how to solve a variety of problems involving momentum. However, there is a lack of guidance in the materials for when or how these materials should be used during the lesson or chapter to provide scaffolding or just-in-time acceleration.
- The materials include goal-setting techniques to support learners in regulating their own learning, as well as self-monitoring, self-reflection, and self-regulation. These elements are incorporated in the “Student Focus Exercise,” which is included in every chapter. For example, when teaching TEK 7C, the student focus exercise guides students in learning new language components and encourages them to seek assistance from the teacher if they encounter difficulties
- Materials include some enrichment activities that contain challenging activities and assignments that extend beyond the regular curriculum and stimulate critical thinking, problem-solving, and creativity. For example, there are Focused Tutorials from topics vertically aligned from K-8 and Physics to relearn and reteach; however, there is a lack of guidance for how and when to assign these during the course of a chapter or lesson to provide scaffolding or just-in-time instruction.

TPS STEAM into Physics

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).	PM
3	Materials consistently support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation.	M
4	Materials represent a diversity of communities in the images and information about people and places.	PM

Partial Meets | Score 1/2

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

Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content. Materials support some 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 guidance and structures to achieve effective implementation. Materials represent a diversity of communities in the images and some information about people and places.

Evidence includes but is not limited to:

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

- The materials provide a range of developmentally appropriate instructional approaches. In Unit 7C, the instructional approaches include a starting discussion on energy transfers, review notes from an earlier unit, analyzing a slide, a teacher-led lecture on the work-energy theorem, creating energy transfer diagrams, reading and summarizing expository text, constructing diagrams, calculating efficiency, drawing energy transfer diagrams, explaining wasted energy, measuring efficiency through a ball drop experiment, and solving problems.
- The materials engage students in mastering the content by employing a variety of instructional approaches. These include using help videos to provide additional support and guidance, designing a car to explore concepts related to the car's crumple zone, solving real-world work problems, and incorporating other interactive activities.
- Each of the units offers a diverse range of engaging activities, typically consisting of at least five different options for student activities, some of which are done in whole groups while others are done in small groups or with partners, for students to actively interact with the materials and concepts. Specifically, in the unit based on Work, students do practice problems requiring

calculations, defend their thoughts by defining vocabulary for other students, and create graphic organizers.

- The materials incorporate a model-revision strategy that facilitates the integration of concepts and evidence acquired throughout the study of the electromagnetic spectrum. This strategy is implemented through a comprehensive background and expository section, which is further reinforced through engaging demonstrations. By revising their initial models, students are empowered to construct a more accurate and refined understanding of the unit's content

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

- Each lesson in the materials provides opportunities for flexible student groupings to support collaboration and engagement. However, specific support for using grouping structures tailored to student needs is not consistently provided. In Unit 7D+E, students engage in reading, discussion, problem-solving, and hands-on activities, all of which can be accomplished through different grouping configurations. Despite this, the teacher text does not offer suggestions or recommendations for effective grouping strategies.
- The materials support a variety of instructional groupings at the end of every section with suggestions for RTI, ELL, and SPED students. Each of the TEKS units offers a variety of student activities that encompass different instructional groupings. Some activities are designed for whole-group engagement, while others are intended for small-group or partner work. However, teacher guidance for the specific groupings is not included.
- The materials offer some support for whole group, individual, and paired instruction; however, there is a lack of evidence for consistent support throughout the activities to ensure teacher clarity for how to implement the groupings. For example, the Energy Unit does not explicitly state how students should be grouped from the Starter/Hook through the Student Activities, yet in the Waves unit, students are explicitly stated to work in pairs and in the Light Waves unit in small groups.

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

- The materials incorporate practice opportunities, including modeled, guided, collaborative, and independent practices. In the work/energy section, the lessons feature explicit direct teaching to provide clear instruction. Following the instruction, students independently practice solving work problems. Additionally, a lab investigation is included to engage students in collaborative practice. This combination of practice types enhances student learning and application of concepts in the work/energy section.
- In each unit, a series of learning activities are provided, which typically begin with guided practice and then transition into independent work for the students. Materials provide completed examples for students as well as partially completed and uncompleted problems to test for mastery.
- Student Tasks provide teacher background and lesson checkpoints multiple times for students to gain an understanding of the materials.
- Some sections provide multiple types of practices in problem-solving. For example, Lesson 5B covers vector resolution. The lesson starts with the teacher modeling the process, then the students solve some in guided practice, and the lesson culminates in independent practice.

TPS STEAM into Physics

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

- The visuals in the materials accurately represent the diversity of the school community, ensuring that students from various backgrounds can feel represented and included. In Unit 8A, for example, there is a photo featuring a Hispanic man and his daughter, showcasing diverse familial relationships. Additionally, the expository text in the materials illustrates the right-hand rule using depictions of individuals with different skin tones, promoting inclusivity and cultural representation. Furthermore, the materials introduce students to a diverse group of famous scientists in each unit. Icons such as Isaac Newton, Marie Curie, and George Washington Carver are among the many scientists depicted in the text.
- In the work/energy section of the student textbook and assessment generator, no photos or text representing diversity were found. However, it is worth noting that there is a document titled “Named Scientists” included, which features a variety of scientists along with their photos and short biographies.
- The materials partially address the diversity of communities in the SMSC (Social, Moral, Spiritual, and Cultural) section at the beginning of each lesson by providing specific examples for information research. However, the section itself does not offer diverse information directly but encourages students to independently seek out diverse perspectives. In the Learn By Doing K-8 resources, there are images and information that cater to a range of student backgrounds, which is commendable. However, the representation of diverse names among famous scientists and engineers is lacking in the notes, tasks, and assessments.

TPS STEAM into Physics

Indicator 7.3

Materials include listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting course-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 the indicator. Materials include some listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting course-level science content expectations.

Materials include some guidance for linguistic accommodations (communicated, sequenced, and scaffolded) commensurate with various levels of English language proficiency as defined by the ELPS. Materials encourage strategic use of students' first language as a means to 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.

- The materials include an ELPS Activity and a section on supporting ELL/ESL students. However, the instructions are generic and do not specify the corresponding ELPS. For example, the How to Help ELL/ESL Students section of the Analyzing Motion lesson states, "Students should work in mixed ability groups and complete the work proposed under the RTI section."
- The supports for ELL/ESL students are sometimes provided separately from the scaffolded course content. For example, in Unit 1H, it is suggested that the teacher assign a grade 8 assessment specifically for ELL/ESL students separate from the physics lesson.
- The Teacher Textbook includes an ELPS Activity section; however, it does not categorize the material into beginner, intermediate, advanced, or advanced high levels or provide linguistically accommodated materials. For example, in the Analyzing Motion lesson, the ELPS Activity states, "Encourage students to read linguistically accommodated content area material with decreasing need for linguistic accommodations as they learn more English."
- The materials provide general suggestions for how to accommodate ELL students. For example, in TEKS 5A, there is a recommendation for students to work in mixed-ability groups and complete the activities provided in the RTI section. The RTI suggests using vocabulary cards and watching an eighth-grade intervention focus video. Additionally, in the context of TEKS 5C, there is an ESL statement advising teachers to encourage students to seek assistance from peers, teachers, friends, and guardians. However, the only observed strategy was the creation of a word wall.

TPS STEAM into Physics

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

- The materials provide suggestions for working with ESL/ELL students; 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 key words. You can have students create a journal of words in their first language and in English."
- The materials encourage some strategic use of students' first languages for academic development in English. For example, TEKS 4A suggests involving another student who is proficient in the students' language in the small group.
- In TEKS section 4A, the materials suggest assigning a mentor who speaks the student's first language as a way to support ELL/ESL students.
- A Spanish Glossary is provided in the materials; however, it is not in the same location as the English glossary.

TPS STEAM into Physics

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.

- Materials provide information to share with students and caregivers about the design of the program. There is a Parent/Caregiver Guide included in the ancillary materials in which the first section outlines the program's philosophy and structure. For instance, the section titled “Philosophy and Science of Teaching” explains the connection between the publisher/author's philosophy and the program's design.
- The Parent Family Guide includes a section titled “Philosophy of Science Teaching and Learning,” which gives multiple examples of research-based strategies related to teaching. For example, the materials say, “Allow for time to process concepts and some downtime for thinking,” and “Students learn best when they enjoy the way a lesson is presented.”
- The materials include a resource called the Family Program Guide: High School that provides information to caregivers about grading for the course. For example, there is a section called “Progress Monitoring” that communicates to the parent how the course should be graded and what the students can expect as far as grades go throughout the course.

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

- Materials provide resources and strategies for caregivers to help reinforce student learning and development. In the Parent/Caregiver Program Guide, there is a dedicated section called Family Support. This section provides guidance for parents on reinforcing the TEKS objectives. It

illustrates the example of TEKS related to safety and demonstrates their alignment across different grade levels.

- The Teacher Program Guide communicates the importance of parents/guardians in helping enforce the TEKS at home. It states how parents/guardians can apply TEKS to everyday life at home and the importance of safety. For example, regarding the safety TEKS, it states, “In high school, it is still vital that students wash their hands. We ask that you discuss washing hands each and every day. Following the events linked with COVID-19, everyone understands the importance of cleanliness.”
- The materials provide at-home activities for caregivers to support student learning and development. For example, in the Family/Caregiver Program Guide, caregivers are instructed to review new terms and definitions with students at home and explore their practical applications in their daily lives. The teacher textbook mentions that Archway is available in the online library for students to work in pairs to read, write, and speak about physics in English.
- Most TEKS units include a Homework section that provides students with assignments to work on outside of school. For instance, in TEKS 1.5, the homework involves students creating a scientific investigation of their choice. These assignments are available in the student textbook, which caregivers can access using the student's login credentials.

Materials include information to guide teacher communications with caregivers.

- Materials provide resources and strategies for caregivers to help reinforce student learning and development. In the Teacher Program Guide, there is a section called “Family Support” that assists teachers in guiding parents to reinforce the TEKS objectives. This section provides an example using the TEKS related to safety and highlights their vertical alignment across different grade levels.
- In the Family Program Guide, there is information guiding caregiver communication. For example, it suggests visiting parks, wetlands, etc., and inviting parents. It also suggests topics for debates/conversations with parents/guardians, such as “How to take care of our pets” and “How to take care of our health,” to name a few.
- The material provides a template for a report card called “Science Report Card.” This resource is found in the Online Library – HS Teacher Support and can be sent home to ensure that the caregiver is informed about how their student is doing in the class. The template states, “As our belief is that science and literacy function together, your child’s evaluation includes information that pertains to performance in both arenas. Please fill in the parent comment section so that we can work together to monitor your child’s progress.”

TPS STEAM into Physics

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

Meets | Score 2/2

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

Materials are accompanied by a TEKS-aligned scope and sequence outlining the order in which knowledge and skills are taught and built in the course materials. Materials provide clear teacher guidance for facilitating student-made connections across core concepts and scientific and engineering practices. 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 materials provide a scope and sequence that includes the corresponding TEKS for all units in the Scope and Sequence. The scope and sequence can be accessed through multiple platforms: via the Online Library - HS Teacher Support and the Teacher Textbook. The scope and sequence contain detailed lists and explanations of each standard and hyperlinks to when and how they are covered in the textbook. For example, Unit 1: Analyzing Motion covers TEKS 5A along with many from TEKS 1-4 and includes the page number, and provides the guidance of four 50-minute class periods.
- Prior to Section 1 in The Teacher Edition, the materials provide a calendar view of each month's scope and sequence with teacher guidance and color coding. For example, the November calendar page shows the days for teaching Core Area 2 in green, and the holidays for Veterans Day and Thanksgiving are shown in pink.
- Instructional materials provide a pacing guide after the forward that lists the purpose and student objectives for each topic. For example, Unit 3 - Series and parallel circuits states, "The purpose of this unit is to analyze, design, and construct series and parallel circuits using schematics and materials such as switches, wires, resistors, lightbulbs, batteries, voltmeters, and ammeters."

TPS STEAM into Physics

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

- The materials provide teacher clarity in helping students understand how activities and experiences connect concepts with background information to associate concepts with real-life situations, such as circular motion and satellites revolving around a planet.
- The units provide a Research History section in every unit that connects the current topic to historical examples. For example, in the Mechanical Energy lesson, the Research History topic is the design of the pendulum. The materials state, “The pendulum is a fantastic and simple example of the conservation of kinetic energy to potential energy (and vice versa) in a system.”
- In each of the units in the teacher’s edition of the book, there is a Learning Activities section that provides guidance on what activities can be conducted to facilitate connections to the core concepts of science. For example, in the Work and Power Unit, there is a full page of teacher guidance for starters/hooks, student tasks, and helpful information on prerequisite knowledge students should use to answer questions such as “The questions become progressively harder as the table is descended. Students will require the use of scientific notation for the harder questions.”

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

- Instructional materials provide opportunities for students to review and practice knowledge and skills through the Assessment Generator located in the Online Library - Physics. For example, the assessment generator allows the teacher to choose current and previously taught TEKS to be included in a particular assessment.
- The materials include intentional practice and spiraling of previously taught knowledge and skills and current lessons’ science knowledge and skills. Every lesson incorporates a section focused on prior knowledge, allowing students to connect their new learning to previously gained knowledge and concepts, reinforcing the spiral learning approach. For example, in Lesson 5G: Newton’s Third Law, the content revisits TEKS 5B, 5C, 5D, 5E, and 5F.
- The early units in the teacher guide focus on the skills the students need to master to be successful, such as scientific practices in investigations, collecting and analyzing data, and developing and using models. These skills are spiraled and practiced throughout the entire course, which can be evidenced by the links in the scope and sequence. Each lesson also includes a boxed section titled “Skills Developed in this Lesson,” which bullets the specific skills being taught or spiraled. For example, in the lesson for Motion in One Direction, the skills listed include rearranging equations, making accurate measurements, numeracy skills, and research skills.

TPS STEAM into Physics

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 course.	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 course-appropriate use of safety equipment during investigations.	M

Meets | Score 2/2

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

Materials provide teacher guidance and recommendations for the use of all materials, including text, embedded technology, enrichment activities, research-based instructional strategies, and scaffolds to support and enhance student learning. Materials include standards correlations, including cross-content standards, that explain the standards within the context of the course. Materials include a comprehensive list of all equipment and supplies needed to support instructional activities. Materials include guidance for safety practices, including the course-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 Program Guide includes instructions for course components, student activities, and online libraries. The teacher's textbook has a section in each lesson that details strategies for reaching diverse learners. Furthermore, a range of Research-Based Instructional Strategies (RBIS), such as creating picture glossary extensions and enrichment activities, are readily accessible throughout the year for all topics.
- The resource consists of slides for all units that align with the Teacher Program Guide. For example, the Teacher Program Guide offers guidance on when and how to use the resources effectively, addressing anticipated student questions and providing corresponding answers.
- The Teacher Program Guide provides clear teacher explanations on how to utilize the resources and includes assessments that are integrated into the course. The materials feature an Online Library that offers clear explanations and addresses common questions to support parents in assisting their students.

TPS STEAM into Physics

Materials include standards correlations, including cross-content standards, that explain the standards within the context of the course.

- The STEAM into Physics TEKS correlations and ELPS correlation documents provide explanations of the standards within the course's context and highlight the specific lessons where TEKS and ELPS are utilized and demonstrate their practical application. The ELPS Correlation guide connects the material covered in different units to the ELPS strategies featured within each specific unit.
- The materials feature science standards correlations that align with the topics covered in the STEAM storybooks. Moreover, cross-content standards for reading and writing are provided alongside the STEAM storybooks and online student journals. The activities within the STEAM storybooks encompass a wide range of disciplines, including reading, writing, art, math, and engineering.
- The lessons provide teachers with background information to create opportunities for students to explore cross-standard information within broad topics. The workbooks contain cross-curricular activities accompanied by a key that identifies the specific curriculum being assessed.

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

- The materials include the STEAM Science Kitting/Materials List - Physics, found in the Online Library HS Teacher Support. The list provides a comprehensive inventory of all the materials and equipment required for instructional activities. The list contains approximately 70 items that range from ball bearings and photogates to a rubber duck and a bowling ball with hooks.
- Materials include the *CeMast Engineering Prof Development Teacher Book,* found in the Online Library - High School Engineering section. The CeMast project involves designing an electric vehicle, and the materials required for the entire project are listed at the start of the engineering activity for easy reference. Some of the materials needed include a tablecloth, metric ruler, brass fasteners, and clay carving tools.
- Section 1 of the Teacher book, Addressing TEKS 1A-1H, includes a subsection titled “Scientific Tools and Equipment.” The Teacher Background section provides a list of equipment that students will be using and need to become familiar with in the course.

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

- The materials reference the use of the Texas Science Safety Standards in the Planning Investigations document. This document is in the Online Library - Student Reasoning Library - Scientific Investigation and Reasoning Handbook. The document states, “Safety information is vital for all types of investigations. Teachers can review and apply/have students apply classroom, laboratory, and field investigation requirements by viewing and applying the Texas Safety Standards.
- In Section 1, Addressing TEKS 1A-1H, the materials include a lesson titled “Safety Practices,” which aligns with the Texas Education Agency Science Safety Standards. For example, the learning objectives state that the students will be able to state the meaning of common hazard symbols, describe examples of good practice in the laboratory in regard to safety, and evaluate the risks of an investigation or field trip through the design of a risk assessment.

TPS STEAM into Physics

- The Online Library - Enrichment contains the Real Science - High School Teacher Edition where activities include safety procedures. For example, in the activity titled “The Burning Question” the procedures state “Review safety procedures and follow all requirements when mixing and heating chemicals. Be sure all students know how to safely handle the Bunsen burner, follow all safety procedures, and wear protective gear.

TPS STEAM into Physics

Indicator 8.3

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

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

Meets | Score 2/2

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

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

Evidence includes but is not limited to:

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

- The Scope and Sequence document outlines the duration of each instructional unit, specifying the number of class periods and minutes allocated to each. For example, 50 minutes is allocated to complete TEKS 1C.
- The Teacher Textbook has each lesson separated by TEKS. The “Pacing and Class Information” at the beginning of each lesson provides the timeframe to complete the lesson. For instance, Newton’s Third Law should take one 50-minute session to complete the Starter/Hook, Student Tasks, and Plenary in order to demonstrate mastery.

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

- The Pacing Document suggests an outline for each core concept to be covered on a weekly basis in a comprehensive plan for implementing the curriculum over the course of a year. Suggestions for teaching, assessing, and reteaching topics are delineated by the core concept with a calendar.
- The Scope and Sequence provides a map of the core curriculum, which progressively builds topics throughout the year for strategic implementation, such as using scalar and vector to teach distance and displacement, followed by instruction in speed and velocity.
- The units in this resource are purposefully organized into main concepts that progressively build upon one another. These modules have similar recurring themes, making them more comprehensive for students. For example, introduction to motion, motion in one direction, motion in two dimensions, and Newton’s Laws are all grouped into one core concept.

TPS STEAM into Physics

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

- The *Teacher Textbook* includes a flexible calendar that provides suggested time for teaching, assessing, and reteaching all core content and TEKS 1A through 4C. In addition, there is a further breakdown of all the lessons, allowing for their completion within a single school year.
- The materials consist of units, lessons, and activities designed to cover a complete year of instruction, as demonstrated in the scope and sequence. The textbook provides flexibility by grouping concepts together, such as Core Area 1 - Forces and Motion and Core Area 2 - Electricity and Magnetism.
- The scope and sequence incorporates scheduling considerations, such as examples of allocating four periods of 50 minutes each, to assist with planning throughout the academic year. For example, two-dimensional motion should be taught during four 50-minute sessions in order to be fully implemented.

TPS STEAM into Physics

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.	Yes
3	Materials include digital components that are free of technical errors.	Yes

Not Scored

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

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

- The actual text pages in the digital text appear to have an appropriate amount of whitespace. However, in practice, the text appears small on the computer screen, making it challenging to read. Although the reader allows for page magnification, it requires the student to navigate the text around the navigation tools, which can be inconvenient for reading.
- Teacher guidance materials are not appropriately designed with clear, designated places for important information. Teacher's Guides are not designed where important information can easily be located for planning, implementation, or reviewing. For example, in the student textbook, there are no hyperlinks to labs, engineering activities, or any other resources. The student must return to the home page and open another window to access a lab, make an assessment, or pull up the Blackline slides. The student must continue to return to the homepage and open and search for what is needed.
- The text on the pages of the student textbook is positioned very close to the page margins (about 1 cm), leaving minimal whitespace. This choice, coupled with the default display showing two pages at once, makes it challenging to read and locate information on the pages without having to zoom in on every page.
- The materials generally incorporate an appropriate amount of white space and a design that does not distract from student learning. However, the small font size for non-titles requires zooming in to read the text effectively. To distinguish sections from each other, bold lettering is used for every new title, making it easier for students to identify different sections, such as Key Vocabulary, Background Information, and Learning Activities.

TPS STEAM into Physics

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

- Materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. In Unit 6B+C, there are diagrams illustrating fields through solenoids and pictures depicting electromagnets. These visuals are thoughtfully chosen and aid students in visualizing and understanding the concept of fields.
- The materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. For example, when covering TEKS 5G and 5H, the images include a swimmer kicking off from the back wall of a pool, a person getting hit with a soccer ball, and a photo of a water rocket. These are excellent examples illustrating Newton's Third Law of Motion.
- In TEKS Section 1E and 1F, several pages are dedicated to displaying different images of various types of graphs, charts, and diagrams. For example, there is a colored periodic table showcasing communication in science, a table showing SI prefixes, and labeled particle diagrams showing the phases of matter
- Materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. For example, TEKS 6B+C provides images of gravitational and electrical fields to demonstrate different forces.

Materials include digital components that are free of technical errors.

- The materials are free of spelling, grammar, and punctuation errors. For example, the student glossary is free of spelling errors. Materials are also free of wrong answers to problems, as seen in the student's textbook.
- The materials include digital components that are free of technical errors.Once the digital pages are loaded and the reader zooms in to read the text, there is no evidence of inaccurate content or information within the student and teacher books.

TPS STEAM into Physics

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 and course-specific 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.	Yes

Not Scored

The 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 the science and engineering practices and course-specific content. Materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. Materials integrate digital technology that is compatible with a variety of learning management systems.

Evidence includes but is not limited to:

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

- Materials integrate some digital technology and tools that support student learning and engagement. For example, student digital components include a digital journal where answers to questions in the task activities can be written, homework can be completed, and vocabulary notes can be taken.
- The materials offer an Interactive Online Assessment Tool that provides students with TEKS-focused questions. The tool prompts the student to answer a question, provides answer choices, then provides feedback to the student. The feedback informs the student of the correctness of their answer choice.
- The materials provide the Online library, NEST Family Videos, where teachers and or students can watch and discuss movies that provide information about the lives of famous scientists/engineers. For example, the NEST Family Video - The Wright Brothers (sample) provides a brief video about the Wright Brothers and their role in creating the first successful flight.
- The materials provide digital slides that align with the Student Tasks in the Teacher and Student Physics Textbooks. For example, the Online Library for Physics includes High School Physics Slides for each unit, and the slides for Unit 6 include several images of charges and forces followed by questions. The Student Tasks for TEKS 5D integrate with the digital slides for Unit 5. The Teacher Textbook for Student Task 1 states, “Students attempt to answer the circular

motion questions on slide 5 and/or the circular motion equations presented in the expository text."

Materials integrate digital technology in ways that support student engagement with the science and engineering practices and course-specific content.

- Materials mention online tools; however, the student task provided in the student textbook only mentions tasks that are physical and not digital. For example, in TEKS 8C, students are directed to observe reflection, refraction, diffusion, and interference with physical objects, not a PhET simulation or digital option.
- The materials for this resource do not integrate digital technology in ways that support student engagement with science and engineering practices. For example, the digital offerings, including the Student Textbook, Student Journal, and Intervention Focus Tutorial - Physics, provide evidence of digital text without videos, simulations, models, etc., that would allow students to apply learning in novel situations.
- Materials do not integrate digital technology in ways that support student engagement with the science and engineering practices and course-specific content. For example, Unit 1D, Waves, includes a student task where students access the internet to research polarized sunglasses. While the internet is digital technology, it is not a tool that is integrated within these materials.
- In the Online Library - HS Teacher Support Materials, there are four short Help Videos over TEKS 5A, 7C, 7E, and 9A. The teacher could view these to better understand content such as momentum and photon frequency.

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

- In the digital materials, there are different activities for the students to do that have opportunities for the students to collaborate with each other in the classroom; however, none of those resources use digital technology to help facilitate those collaborative interactions.
- Materials do not integrate digital technology that supports teacher-to-student collaboration. No teacher-to-student digital collaboration was found in the teacher textbook, assessment generator, or high school physics slides.
- Materials mention collaboration between students and teachers for learning through the Archway, but the materials provided are m an online book and not digital technology where the teacher and students can interact in real-time.

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

- Digital materials are accessible and compatible with multiple operating systems and devices For example, the orientation guide mentions the tools available for students through the online library, such as Archway, iMast, and among others, the assessment tool.
- Materials provide evidence of learning management system compatibility. For example, the Program Guide states that "The materials integrate with a variety of learning management systems such as Clever."
- The materials are accessible and compatible with Chromebooks, iPads, PCs, Apple computers, and/or smartphones.
- The materials are accessible online through any device with internet access. The materials state to view content online, visit the webpage, enter your username and password, and click Login.

TPS STEAM into Physics

Indicator 9.3

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

1	Digital technology and online components are developmentally appropriate for the course 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

Some digital technology and online components are developmentally and course-appropriate and provide some support for learning.

Digital technology and online components are not developmentally appropriate for the course 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 course and align with the scope and approach to science knowledge and skills progression.

- Digital technology and online components do not align with the scope and approach to science knowledge and skills progression. The online components mainly consist of searchable document libraries without any links or embedded tech, such as videos or simulations.
- .Materials do not provide a description of (and rationale for) the amount of time students should access digital materials via screens by grade level. Materials do not include information about the incorporation of developmentally appropriate advanced software, coding tools, and data analysis platforms.
- The materials are limited largely to a digital copy of the textbook, which is developmentally appropriate for the course and aligned to the TEKS.
- The materials do not provide information about integrating developmentally appropriate advanced software, coding tools, or data analysis platforms. For example, the Teacher Guide mentions other materials like Learn By Doing as the first step in beginning high school physics. However, these are K-8 digital readers that cover material far outside of the physics scope and sequence, covering topics such as heredity and climate change.

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

- There is no evidence of embedded technology, such as links to other resources within the text, simulations, animations, videos, interactive problems, interactive web pages, etc.

- The materials do not provide support for teachers to successfully integrate the technology within the program. Materials provide some clear instructions and tutorials within the teacher platform on how to use the embedded technology. The Teacher Program Guide High School advises teachers to use the videos. However, in another example, the How to Use the Program Guide instructs users to first read the one-page guide, followed by the teacher textbook introduction, and then review the scope and sequence. In addition, the materials lack step-by-step instructions for setting up and using the technology, as well as troubleshooting tips for common problems that teachers may encounter.
- The materials include a video on how to set up the assessment generator tool; however, the video fails to address how that technology could be used to support or enhance student learning.
- The teacher guide includes images and instructions on how the materials could potentially work; however, there may be difficulties with functionality. For example, the panel table of contents in the textbook's navigation does not work for both the teacher and student versions.

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

- The Family Program Guide provides a limited amount of information on accessing online resources. The guide informs parents that a guide is available for parents and caregivers.
- The materials offer teacher guidance for digital and online assessment tools in the assessment guide through two videos. The first video demonstrates how to generate a printed or digital test from a test bank, while the second video shows how to customize questions and question types.
- The parents/caregivers can use their students' account credentials to access the materials, and there is information in the resource guide for the parents/caregivers on how to use the materials.
- The materials include resources for parents and caregivers on how to support student engagement with digital technology and online components. For example, a Parent/Caregiver guide is given that states what is necessary for success: a list of TEKs for physics among other sciences is present; a how-to guide for logging into TPS is provided; and if any of the other materials prove to not be enough, a 1-800 number is provided for assistance.