Kiddom OpenSciEd Grade 8

Kiddom OpenSciEd Grade 8 Executive Summary

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

Grade	TEKS Student %	TEKS Teacher %	ELPS Student %	ELPS Teacher %
Grade 6	81.63%	81.63%	100%	100%
Grade 7	78.85%	78.85%	100%	100%
Grade 8	83.67%	83.67%	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 designed to build knowledge systematically, coherently, and accurately.
- The materials provide educative components to support teachers' content and coherence knowledge.

Section 4. Productive Struggle

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

Section 5. Evidence-Based Reasoning and Communicating

- The materials 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 guidance that explains how to analyze and respond to data from assessment tools.

- The assessments are clear and easy to understand.

Section 7. Supports for All Learners

- The materials provide guidance on fostering connections between home and school.
- The materials include listening, reading, writing, and speaking supports to help Emergent Bilinguals meet grade-level science content expectations.
- The materials include a variety of 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 some practice and review opportunities that support instruction.
- The materials include classroom implementation support for teachers and administrators.
- The materials provide implementation guidance to meet variability in program design and scheduling.

Section 9. Design Features

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

Section 10. Additional Information

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

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Indicator 2.1

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

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

Meets | Score 4/4

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

Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of grade-level appropriate scientific and engineering practices as outlined in the TEKS. Materials provide multiple opportunities to make connections between and within overarching concepts using the recurring themes. Materials strategically and systematically develop students' content knowledge and skills as appropriate for the concept and grade level as outlined in the TEKS. Materials include sufficient opportunities, as outlined in the TEKS, for students to ask questions and plan and conduct classroom, laboratory, and field investigations and to engage in problem-solving to make connections across disciplines and develop an understanding of science concepts.

Evidence includes but is not limited to:

Materials provide multiple opportunities for students to develop, practice, and demonstrate mastery of grade-level appropriate scientific and engineering practices as outlined in the TEKS.

- Materials include opportunities for students to ask questions that can be answered using evidence from investigations or gathered by others.
- In Unit 8.5 Genetics, Lesson 1, a section called "What Students Will Do" combines the TEKS with Science and Engineering Practices (SEPs). It explains what the students will be doing at different points of the lesson: developing a model, asking questions, and carrying out an investigation, to give students multiple opportunities to practice and develop mastery of the content standards.
- Each lesson begins with a section labeled "This Lesson," which goes over the investigations and hands-on activities that will take place to answer the investigative question using science and engineering practices.

- TEKS 8.1A expects students to ask questions and define problems based on observations or information from text, phenomena, models, or investigations. Materials ask students to observe photos of cattle and ask why the musculature is significantly different between the examples.
- TEKS 8.1B expects students to use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems. Materials ask students to investigate how spring scales help students see how the forces compare when two objects gently push or pull on each other.
- Students are asked in Unit 4, Lesson 3, to explain how the sun's position on the horizon appears to change over the course of the day. Students create models to explore why this is happening, then revise their models in small groups to account for changes in the amount of daylight. This lesson corresponds to student expectation 8.1A, in which students are expected to "ask questions and define problems based on observations or information from text, phenomena, models, or investigations."
- In Unit 1, Lesson 1, students develop a model to explain what is happening when two things come into contact in a collision. Students explore the factors that might affect the outcome of such collisions. In Lesson 8.1, students collaborate and discuss different types of cell phone damage after a collision. Students then model their explanations of those collisions. These expectations coincide with TEKS Students Expectation 8.1A, in which students are expected to "ask questions and define problems based on observations or information from text, phenomena, models, or investigations."

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

- Grade 8 materials use the recurring theme of cause-and-effect relationships. Within Unit 8.1, students construct an argument supported by evidence and scientific reasoning of cause and effect and apply scientific ideas and use evidence to construct an explanation for how peak force and energy transfer in soccer collisions cause instability in the brain due to sudden changes at the cellular level. Materials ask students to apply scientific ideas and evidence to construct an explanation for the causes of motion and kinetic energy changes that happen before and after collisions and how these affect the outcome of a collision.
- In Unit 7, students identify how global patterns of atmospheric movement influence local weather. Lesson 3 asks students to connect these patterns of atmospheric movement to the previous heat transfer activity where they tested thermal transfer in a cup system.
- Students consider "How penguins and other things living today could be connected to the things that lived long ago." Students observe a fossil of a giant penguin from long ago and analyze data about penguins living today. They then develop initial explanations of how these penguins could be connected.
- The materials identify overarching concepts using recurring themes and show how they connect within the materials. For example, students consider how penguin fossils compare to penguins living today and develop initial explanations of how past and present organisms are connected.
- In grades 6–8, students make other connections in themes and patterns during their study of how plate movement causes mountains and volcanoes, changes and stability in an ecosystem, as well as the cause-and-effect relationship between force and motion.

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

- Materials for grades 6–8 found in the teacher guide build on prior unit content so students make deeper connections with topics throughout the year.
- The materials are designed to develop and build student skills and content knowledge using phenomena appropriate to the grade level as outlined in the TEKS. For example, materials for grades 6–8 use teacher support with the storyline and Driving Question Board (DQB). The units are further organized into lessons with anchoring phenomena and time-stamped parts of the lesson. Each one develops concepts by reading, writing, hands-on labs, and math connections. These conclude with a review and assessment.
- Students' prior ideas and understandings are elicited, valued, and built upon. Students and teachers work together to figure out where to go next, what evidence is needed, and how it can help them answer questions about a larger phenomenon or solve a problem. Students engage in science and engineering practices in meaningful ways in order to make progress on their questions.
- For example, grade 8 units strategically integrate SEPs through Unit questions and hands-on activities that support instruction within each lesson. This practice is outlined in the "What Students Will Do" at the beginning of each lesson.
- The materials support teachers in developing student content concepts and skills by giving them cues and support within the lessons in the eighth-grade curriculum. For example, materials contain a Teacher's Guide that contains "Lesson Learning Plan Snapshot" and "Where We are Going and Not Going" sections that explain, describe, and make connections between the SEPs and the development of conceptual understanding.
- The materials support teachers in developing student content concepts and skills by giving them cues and support within the lessons in the eighth-grade curriculum. For example, materials contain a Teacher's Guide that contains "Lesson Learning Plan Snapshot" and "Where We are Going and Not Going" sections that explain, describe, and make connections between the SEPs and the development of conceptual understanding.
- Students are prompted to explain the mechanisms that caused the observable changes, which will provide an opportunity to bring related information from prior grades: grade 4 (energy transfer in collisions) and grade 2 (objects pull or push each other when they collide).
- Each lesson in the unit builds upon the previous lesson. For example, Unit 2 is about sound waves. In Lesson 1, students observe various musical instruments and a speaker when they are making sounds and connect what they discover to what they observe when they analyze slow-motion videos of similar objects. Lesson 4 asks students to consider how the vibrations of a sound source compare for louder versus softer sounds. Subsequently, in Lesson 5, students ask, "How do the vibrations from a sound source compare for higher-pitch versus lower-pitch sounds?"

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

- Students are provided opportunities to engage with scientific and engineering practices multiple times and in multiple contexts with DQB and anchoring phenomena.

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- Students are given multiple opportunities to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models. For example, students make connections across disciplines through reading, writing, and math skills.
- In lessons within 8.1, “What happens when two things hit each other?,” students model what they think might happen at the moment of impact and a split second after a collision where something breaks and a collision where something does not break. Students consider some of the factors that could have made a difference in the outcomes of the collisions, which motivates students to create a DQB and brainstorm possible investigations they could do in order to answer the questions.
- In Lesson 4, Unit 8.1, “How much do you have to push on any object to get it to deform temporarily vs. permanently?,” students plan and carry out an investigation to look at the relationships between contact force applied and the amount of deformation that occurs in different materials. Students construct graphs of the data and compare them to those from other materials tests. Finally, students develop a model to represent the elastic and inelastic behavior of all solid objects in response to varying amounts of force applied to them.
- In Unit 8.1, Lesson 9, students conduct station investigations to explore other forces in collision systems and construct explanations for investigations done at the stations.
- In Unit 8.5, Lesson 9, “How do farmers control the variation in their animals?,” investigations range from online simulations of selective breeding to Lesson 10, where students read scientific texts and construct an explanation using models and math to describe how sexual reproduction results in offspring with genetic variation.
- The DQB is a tool used throughout the OpenSciEd units as a way to generate, keep track of, and revisit student questions that drive the investigation of the anchoring phenomenon and related phenomena. A DQB is used at the beginning of each unit to capture students’ questions about phenomena. These wonderings lead to investigations that help students explore and figure out the phenomena. The DQB is then revisited throughout the unit to document the progress students are making and to launch deeper investigations and problem-solving.

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Indicator 2.2

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

1	Materials embed phenomena and problems across lessons to support students in constructing, building, and developing knowledge through authentic application and performance of scientific and engineering practices, recurring themes and concepts, and grade-level content as outlined in the TEKS.	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 embed phenomena and problems across lessons to support students in constructing, building, and developing knowledge through authentic application and performance of scientific and engineering practices, recurring themes and concepts, and grade-level content as outlined in the TEKS. Materials intentionally leverage students' prior knowledge and experiences related to phenomena and engineering problems. Materials clearly outline for the teacher the scientific concepts and goals behind each phenomenon and engineering problem.

Evidence includes but is not limited to:

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

- The materials use phenomena as a central anchor that drives student learning across grade-level content in each discipline (earth/space, life, physical science). These anchoring phenomena are used to draw students into the storyline by presenting the natural challenge of explaining something or solving a problem. Students examine phenomena using science and engineering practices (SEPs) through the lens of recurring themes. Students develop content knowledge as they work to construct explanations of the phenomena and/or solve engineering problems.
- The materials embed thought-provoking phenomena and engineering problems that require grade-level explanations. Materials also provide opportunities for students to develop, evaluate, and revise their thinking as they figure out phenomena and solve problems in the lessons.
- Every sixth through eighth-grade Unit Storyline is a journey to figuring out a phenomenon that defies easy explanation. It could be a phenomenon that students need to understand to address a problem, such as predicting and preparing for a violent storm. It might be a phenomenon that they want to know how to control, like soil erosion on a farm, or an everyday phenomenon that mystifies students when they stop to think about it, like why droplets of water spontaneously appear on the outside of a glass of cold water.

- In grades 6–8, materials embed opportunities for students to investigate phenomena and problems before, during, and after lessons as they construct, build, and develop their knowledge of the grade-level content. For example, in grade 8, students collect data and analyze the weather, climate and the water cycle.

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

- The materials allow for a variety of learning opportunities of phenomena and/or solving problems using prior knowledge and experiences. For example, grade 8 students' prior knowledge of sound and experiences relates to the phenomena of how sound travels.
- Each unit builds on prior work on SEPs or crosscutting concepts (CCCs) begun in earlier units. For example, Unit 3, Lesson 2, asks students to share what they already know about magnets in order to explain the role of a magnet in a homemade speaker.
- In Unit 8.2, Lesson 1, Sound Waves, students observe a speaker, like the one in the truck from the video, up close. They notice and wonder how the speaker can make a nearby "window" move.
- In grade 8, students gather photos of examples of trait variation they have seen in their own lives and share them with the class. Students have discussions about the many variations they observed in the photos. These discussions spark questions and ideas for investigations exploring these differences in living things.
- In grade 8, students consider situations where they have seen their phones break. They contrast these situations with others where something else collided with another object and either did or did not break and why.

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

- There is a Teacher Background Knowledge section that provides what is the anchoring phenomenon and why it was chosen for the unit. It also provides the SEPs and focuses that are used in the unit.
- There is a Unit Overview that begins each Unit in grades 6–8. This overview outlines for the teacher the goals and scientific concepts behind the phenomenon and engineering problems in the unit.
- Each lesson plan details what students will do and why, outlines a plan for instruction, outcomes to look for, and future lesson goals. The teacher edition describes the lesson procedures and instructional strategies, including key ideas for teachers to emphasize in each lesson.
- Each lesson provides an overview for the teacher, including "what students will figure out," which is a bulleted list of key concepts that students should understand by the end of the lesson.
- The beginning of each unit has an overview for teachers that explains "How students will engage with each of the phenomena," which summarizes how students progress through each part of the unit.
- Materials give guidance to teachers regarding the scientific concepts and objectives underlying each phenomenon and engineering problems that correspond to content concepts across the grade level. Materials provide opportunities for students to build an understanding of grade-level content through unit-level or chapter-level phenomena or problems.

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Indicator 3.1

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

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

Meets | Score 6/6

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

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

Evidence includes but is not limited to:

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

- Materials are designed to build and connect student knowledge. For example, in the Teacher Background Knowledge for Unit 8.9, the section “Where does this unit fall within the OpenSciEd Scope and Sequence” provides information about what this unit is designed to be taught after/before, what Performance Expectations the Unit focuses on, and how Units build across multiple units. In the Teacher Background Knowledge for Unit 8.9, “What additional ideas will my students have or know from earlier grades or OpenSciEd units?” informs about what prior knowledge from fifth-grade units and what content they will be building and connecting new knowledge across the units in eighth grade.
- Materials are vertically aligned. According to the Teacher Background Knowledge document in Unit 9, the unit is designed to be taught after Unit 7.4: (Maple Syrup Unit). As such, it can leverage ideas about food webs, producers, consumers, and interactions between these organisms in an ecosystem. Other prior engineering design-focused units, such as OpenSciEd Unit 6.2: (Cup Design Unit), OpenSciEd Unit 6.5: (Tsunami Unit), and Unit 7.2: (Homemade Heater Unit), will allow students to leverage what they know about criteria, constraints, iterative design cycles, stakeholders, and optimizing designs. This unit is designed to be taught prior to OpenSciEd Unit 7.6: (Droughts and Floods Unit), which focuses on natural water resources, changing precipitation and climate, and human impacts.

- In the Middle School Scope and Sequence document, there is a graphic that shows how units build on what students have figured out so far about the disciplinary core ideas (DCIs) in these earlier units. Arrows show DCI connections between units, indicating that the later unit builds directly on what students figure out about the DCIs in the prior unit. The small dots at the top right of each unit also show connections, indicating the science strands the unit builds upon. For example, Unit 7.3 is shaded to represent that the unit emphasizes Life Science, and the dots on its top right indicate that this unit builds on both Life Science and Physical Science ideas from earlier units (6.6., 7.1, 7.2).

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

- Materials sequence in a way that activates or builds prior knowledge before explicit teaching occurs that allows for increasingly deeper conceptual understanding. Grade 8 students in Unit 8.2 generate questions about three aspects of sound phenomena and use models to engage in reasoning and argumentation to develop models to explain “What makes sound? How does sound get from the truck to the window, and why does the window shake like it does?”
- In Unit 8.1, Lesson 1, students are presented with the problem of millions of phones breaking each year; students reenact some phone-breaking scenarios. Students draw a model to explain the interactions occurring between the objects during a collision and the factors and variables that might contribute to a different outcome.
- In the first part of Unit 1, students make general observations about what happens to objects during collisions and quickly move to analyze data that show that objects deform when forces are applied. In the second part of the unit, students design solutions to protect an object of their choice in a collision. Finally, the unit re-anchors around a related question and a design problem to figure out what kinds of solutions we can design to protect fragile things from breaking. Additionally, students calculate and analyze how the acceleration of an object is dependent upon the net force acting on the object and the mass of the object using Newton's Second Law of Motion. Students investigate and describe how Newton's three laws of motion act simultaneously within systems.

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

- The materials clearly and precisely present grade-specific core concepts, recurring themes and concepts, and science and engineering practices. For example, in grades 6–8, the teacher handbook provides teachers with a clear and concise summary of OpenSciEd Instructional Elements that leads students to learn via science instruction. Within this document are important course-specific concepts, recurring themes, and SEPs. The materials also include resources for differentiating lessons for a variety of learners. The materials include student-driven conceptual learning strategies, concrete mathematical applications, and hands-on practice.
- An OpenSciEd unit storyline is a logical sequence of lessons that are motivated by students' questions. It is a science storyline because the questions arise from students' interactions with phenomena. Each step is designed to enable students to make progress on their questions by using SEPs to help figure out a piece of science idea. Each piece they figure out adds to the developing explanation, model, or designed solution. A storyline provides a coherent path

toward building a disciplinary core idea and cross-cutting concepts anchored in students' own experiences and questions.

- According to the Middle School Program Overview, the Middle School Program is organized around units that each target a bundle of performance expectations. The program is sequenced to enable units to build on what students have developed in prior units while supporting the development of disciplinary core ideas (DCIs), crosscutting concepts (CCCs), and SEPs coherently across the program. This coherence allows for presenting the concepts in a way that makes sense to students.

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

- Materials include specific learning targets for each grade level. For example, materials provide a lesson plan document that outlines when learning targets are introduced, developed, and mastered within the unit. Also, the unit overview shows unit and lesson objectives with detailed time-stamped instructions on what students will do, figure out, and be assessed on.
- Materials define the boundaries of the main concepts that students must master for the grade level or course. In the final assessment for the Unit, students are prompted to demonstrate mastery by how they were taught in the Unit. Students will explain situations, plan and carry out an investigation, analyze data, and complete STAAR new items type questions.
- Materials provide an assessment system that has five different kinds of assessments embedded in the unit: formative, summative, pre-assessment, self-assessment, and peer-assessment. Each unit’s key assessment moments are listed in the Assessment Overview Table as well as the necessary materials and associated keys. The system is grounded in the recommendations of the National Research Council (2014) report, Developing Assessments for the Next Generation Science Standards.

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Indicator 3.2

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

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

Meets | Score 6/6

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

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

Evidence includes but is not limited to:

Materials support teachers in understanding the horizontal and vertical alignment guiding the development of grade-level content, recurring themes and concepts, and scientific and engineering practices.

- Materials include guiding documents that support teachers in understanding how new learning connects to previous and future learning across grade levels. For example, grades 6-8 include a teacher guide with the description of the unit.
- Materials outline the horizontal alignment of disciplinary core idea (DCI) progressions throughout the middle school program. Along with the horizontal alignment, the progression of complexity is stated.
- There is an OpenSciEd Scope and Sequence that indicates where the Unit will fall in the curriculum. It is guided by the Next Generation Science Standards (NGSS) performance expectations as well as the crosscutting concepts (CCCs) and science and engineering practices (SEPs).
- In the Middle School Scope and Sequence document, there is a graphic that shows how overreaching science ideas are organized into bundles corresponding to the 18 units (six per grade), how these units are sequenced, and how units build on what students have figured out so far about the DCIs in these earlier units. Arrows show DCI connections between units, indicating that the later unit builds directly on what students figure out about the DCIs in the prior unit. The small dots at the top right of each unit also show connections, indicating the science strands the unit builds upon.

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

- Materials identify common grade-level misconceptions within the lesson information document. Materials in grades 6–8 are labeled as “where we are not going.” It states what level of understanding the student should have and what they will not understand through the unit. Throughout the lessons, teachers are provided “Assessment Opportunities.” In this section, the lesson explains to teachers what to do if students don't understand the content. For example, in Lesson 7, Day 2 of Unit 8.1, the Assessment Opportunity explains how a teacher can help students revisit an investigation if they don't correctly answer Q3 or Q4. This guidance explains exactly what teachers should be listening for in student explanations and how to redirect students if there are gaps in student learning. These alternate activities are provided in most lessons to support teachers in recognizing barriers to students’ conceptual development and always present ways to help students overcome these barriers.
- In Unit 8.1, Lesson 2, there is an additional guidance section outlined for teachers with guidance as well as explanations and examples. This section gives suggestions on what teachers can do if the group is struggling. There are suggested prompts and examples for teachers to review with students. There is a supporting emergent multilingual students section that is given to help with students’ conceptual development, guiding teachers on how to help them complete investigations. Materials build toward the performance expectation, which guides teachers on key ideas and what to look and listen for, as well as what to do in different activities and situations for students.
- Possible student misconceptions are addressed within some of the lessons. For example, in Unit 5, Lesson 1, “Where We Are NOT Going,” it is suggested that “students may come to this unit with prior knowledge and experiences that can be leveraged. Remember not to let words or representations in students' models signal a false understanding of how sound works on a deep, mechanistic level.”

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

- The Middle School Program Overview provides the intent and purpose of the instructional program as well as the rationale for unit and lesson design. This document explains the structure of the program as well as the rationale behind the program's scope and sequence.
- The Teacher Handbook explains the program's instructional approach. It provides teachers with an instructional model to follow as they navigate this program. The Teacher Handbook explains crosscutting concepts and anchoring phenomena, and science and engineering practices. Three concepts that are at the core of this program.
- The Science and Engineering Practices (SEPs) are intended to work together in a way to help students ask, investigate, and figure out science ideas. For example, the SEP is 2.A, Define a pattern of design problems for systems that provide food resources that humans need (cause) but transform the land and the biosphere once occupied by native plants and animals (effect). Students will be using the element of patterns as a lens for making sense of the three cases of vegetable oil that they will investigate in the lesson.

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Indicator 4.1

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

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

Evidence includes but is not limited to:

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

- According to the Middle School Program Overview, this program "is a comprehensive middle school science curriculum that empowers students to ask questions, design investigations, and solutions, and figure out the interesting and puzzling world. OpenSciEd empowers students to be the knowers and doers of science and develops a classroom in which the ideas heard from peers move thinking forward and develop students' abilities to think, read, write and argue as scientists and engineers."
- The Teacher Handbook explains the use of "Storylines" to provide students with a coherent experience that is motivated by the students' own desire to explain something they don't understand or to solve a problem. Materials identify the sequences of activities for students to use sensemaking. Students observe a phenomenon and then must brainstorm, collaborate, collect, organize, and analyze data to include illustrations: "Learners should be motivated to work through the next step in a science unit just as they are motivated to see what happens next in an unfolding story."

- Students in grades 6–8 have a science notebook that creates a space for students to record investigations and communicate their ideas about phenomena. Developing this notebook can create meaningful sensemaking and a sense of ownership of their work through reading, writing, thinking, and acting like scientists and engineers. It is a record of how their ideas evolve over time. For example, in Unit 8.4, Lesson 4, students use their scientific notebook to identify connections between the amount of daylight and seasonal temperature changes, examine data to determine the relationship between Earth's distance, develop a physical model to explain that seasonal create a gotta-have-it checklist to explain differences, examine data, and build understanding about the relationship between solar elevation and intensity of light on Earth's surface.

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

- Materials provide multiple opportunities for students to engage with grade-level appropriate scientific texts to gather evidence and develop understanding of concepts. For example, in Unit 8.5, Lesson 6, students read and synthesize two articles to find evidence of causal relationships among alleles, proteins, and phenotypes. In Unit 8.5, Lesson 13, students investigate artificial selection in plants by reading “How do we get new tulip variations?” and “Breeding Tulips” and research and discuss how the genetic information of offspring from asexual reproduction compares to that of the parent.
- In Unit 1, “Contact Forces,” students read an article to learn about engineering techniques and practices to evaluate a design created by engineers. The teacher facilitates a classroom discussion by asking students questions about the engineering design process as well as the importance of math in engineering. In Unit 7, Weather, Climate, and Water Cycling, students read an article to learn how to use the periodic table to identify atoms in elements. The teacher gives students a list of questions to answer based on the article. Students write the answers to the questions in their notebooks as well as any other questions they may have after reading the article. The class discusses all of the questions at the end of the lesson.
- For example, in Unit 8.8, students read about droughts and floods and then discuss and type findings on an online jamboard. Also, teachers are directed to use chart paper for students to record their wonderings. Each unit also comes with a student edition, which provides readings. There are student handouts designed for situations where students need to draw or write on an image or graphic organizer. Students use what they know from their investigations and what they learn in the reading to make predictions about future data.

Materials provide multiple opportunities for students to engage in various written and graphic modes of communication to support students in developing and displaying an understanding of scientific concepts.

- Materials provide multiple opportunities for students to engage in various written and graphic modes of communication to support students in developing and displaying understanding of scientific concepts. For example, in Unit 8.3, Lesson 1, students develop individual models in their scientific notebooks to explain how the parts of the speaker work together to cause forces that vibrate the speaker. In Unit 8.4, students develop, refine and revise a model about forces that include magnetic forces interacting at a distance via fields that extend through space through a series of hands-on investigations.

- The Anchoring Phenomenon pushes students to represent their initial thinking by writing, drawing, and sharing their own initial models, explanations, or design solutions. These might be represented in their science notebooks. For example, students model cell phone breakage and ask what might happen at the moment of impact and a split second after a collision. Students consider some of the factors that could have made a difference in the outcomes of these collisions. Students create a Driving Question Board (DQB) and brainstorm possible investigations they could do in order to answer their questions.
- In Unit 6, Lesson 4, students analyze data tables of bone-related structures for ancient penguin fossils and modern penguins and develop a timeline-based representation of the patterns in the data. Students analyze images, maps, and descriptions of the environments where these fossils formed. They then consider their evidence to make revisions or updates to their model. For example, in Unit 4, Lesson 13, students gather information from a reading to identify connections and observations others have made about one planet in the solar system. They notice additional patterns in other observations and record new questions. Then, they use a model showing the relative position of motion of Venus and Earth in the system to explain these patterns. Finally, they analyze the scale properties of other planets to look for other patterns.

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

- Materials provide authentic student engagement and perseverance of concepts through productive struggle while acting as scientists and engineers. For example, in Unit 8.1, students observe various musical instruments and a speaker. When sounds are made, they make a connection with analyzed slow-motion videos of similar objects. Students construct a model to represent the shape changes observed over time and apply the model to another instrument.
- In Unit 2, Sound Waves, students are introduced to an anchoring phenomenon, which will be referred to throughout the unit. Students are encouraged to ask questions about patterns in observations that can be investigated to figure out how sound travels and causes movement in other objects. Students use the observations from these phenomena to think about other sound-related phenomena, which in turn leads us to form a broader set of questions that they add to a common DQB. Students then brainstorm ways for the class to investigate these questions. Finally, students develop a model to explain how a sound source can make another object move.
- According to the Teacher Handbook, each unit includes a “making sense” portion. This portion represents the part of the unit where “students try to come up with an explanation, model, or some other reasoning to explain why or how the phenomenon under investigation is happening. The point of this element is for students to voice their initial ideas about the phenomenon, no matter how inaccurate or far-fetched they may be. The purpose is to lay a foundation for the investigations they will conduct throughout the unit that will lead them to a scientific understanding. By trying to make sense of the phenomenon themselves, students generate ideas that lead to questions and theories that they will want to investigate.”
- For example, in 8.1, students observe various musical instruments and a speaker. When sounds are made, they make a connection with analyzed slow-motion videos of similar objects. Students construct a model to represent the shape changes observed over time and apply the model to another instrument.
- For example, in 8.4, students connect patterns in the sky to their daily lives and discover how those patterns set the rhythms for life on Earth. They must view the patterns from different

perspectives, such as how light travels to Earth's rotation and the effects of the planet's revolution.

Kiddom OpenSciEd Grade 8

Indicator 5.1

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

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

- Materials provide opportunities for students to develop how to use evidence to support their hypotheses and claims. For example, in Lesson 8.2, teachers are given a script of the lesson to help guide the student with the data that has been collected. Students then work together to make a claim and support it with evidence from the analysis of the data.
- For example, in Lesson 8.1, students complete Making an Initial Claim and the Claims Organizer. This activity supports students in engaging in presenting arguments from evidence by providing a structured way to record evidence from investigations. Students use the evidence collected to support or refute their original claim.
- For example, students attempt to put ideas in the Gotta-Have-It Checklist to explain a phenomenon or design a solution, working individually first so that all students are given the opportunity to synthesize the evidence and formulate their ideas. Students bring data gathered in an investigation to a Scientists Circle.
- For example, in grade 8, Lesson 3, Day 1, students make an initial claim about objects making sounds when they vibrate, gather evidence, then refer back to decide if their evidence supports or refutes the claim by completing a graphic organizer. They use a graphic organizer for support and are prompted to explain why their evidence supports their claim. They come to a consensus

about how changing the amplitude and the frequency of vibrations changes how much energy is transferred.

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

- Materials include opportunities to develop and use vocabulary after having a concrete or firsthand experience to which they can contextualize new terms. For example, grades 6–8 materials present scientific vocabulary terms using clear photographs, videos, and definitions in student-friendly language. Each unit storyline includes graphic pictures and diagrams. During the experiments, students record evidence that supports their claims during investigations in their science journals.
- For example, in Unit 8.1, a glossary is provided that defines and indicates where new scientific vocabulary is being introduced in each lesson. Materials recommend that "As new scientific terminology is developed with the class, you build a word wall of these ideas. Keeping a visual model, or examples if applicable, next to each word can help students recall the concept associated with the word. Encourage students to contribute ideas for visual representations or to share and display on the class Word Wall their own drawings they made from the previous investigation."
- For example, in the grade 8 unit titled "Genetics," Lesson 1 has the teacher point out to students that scientists have specific words to use when describing the differences in the characteristics of organisms. The teacher then defines the words "trait" and "variation." Students add the words to their word walls. Students are then asked to work in small groups to observe photos of tulips and identify traits and variations.

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

- Materials provide opportunities for students to develop how to engage in the practice of argumentation and discourse. For example, in Grade 8, Unit 1, Lesson 1, students are taught how to use a "Scientists Circle," in which a student shares one idea and writes it on the board or poster. Then, that student passes the marker to the next student. The second student then shares an idea. If the idea is on the poster already, the student should say which idea is similar and how it is similar. In this way, the marker is passed all around the circle, and all students have a chance to have their thinking represented on this poster. Teachers remind students that if they have additional ideas that don't end up on the poster, they should jot them down now and then raise a hand to share only after the marker makes it all the way around the circle.
- For example, materials use three specific scientific communication types: Initial Ideas, Building Understanding, and Consensus. First, students share initial ideas/experiences, make connections between peer observations and real-world experiences, and provide a chance to share and make sense of ideas. Second, students share, connect, critique, and build on others' findings, claims, evidence, and explanations and provide the teacher and students with opportunities to clarify identified problems and which ones need further investigation. Lastly, students collectively work towards a common explanation and come to a consensus.

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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.

- Materials provide instruction for how to construct and present a verbal or written argument to problems using evidence acquired from learning experiences. For example, in grades 6–8, all units begin with phenomena that are carefully selected to anchor a storyline and to motivate the development of target disciplinary core ideas, crosscutting concepts, and science and engineering practices. These anchoring phenomena are used to draw students into the storyline by presenting the natural challenge of explaining something or solving a problem. Other phenomena may be introduced at key points in a storyline to maintain interest or push students to delve more deeply.
- For example, Lesson 3 of Unit 1 is meant to draw out students' prior experiences with collisions and help them consider what might determine whether something breaks in a collision. Students generate questions based on the overarching question, "Why do things sometimes get damaged when they hit each other?" and discuss their questions with their peers.
- For example, in grade 8, Lesson 8.1.04, students are given a prompt about a foldable phone that has an unbreakable screen. The students are given a graphic organizer to complete based on prior evidence from investigations. They then have to collaborate and discuss their thoughts.
- For example, in Unit 8.8, students build understanding through discussion using the scientist's circle. Students work together as a group to justify explanations of phenomena and discuss evidence acquired from learning experiences.

Kiddom OpenSciEd Grade 8

Indicator 5.2

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

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

Meets| Score 4/4

The materials meet the criteria for this indicator. Materials 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.

- Materials provide teacher guidance on anticipating student responses and the use of questioning to deepen student thinking throughout the lessons. For example, in grade 8.5, Lesson 1, Day 2, students are given pictures of cows. The teacher is instructed to make a notice/wonder chart and complete it as a class. The teacher is given prompts and possible student responses, as well as follow-up questions such as, "We focused specifically on the muscles of these cattle just now, but look at your photo and the ones around you: What other characteristics do these cattle have that we could sort or organize them by?"
- For example, in Unit 7, "Setting the Stage for Learning," students read an article about how matter is classified as elements, compounds, homogeneous mixtures, or heterogeneous mixtures. The teacher then facilitates a classroom discussion by asking students a set of questions. Materials provide sample student answers to the questions.
- For example, in Unit 4, Lesson 1, students analyze how the Sun aligned with human-made structures on a particular day of the year and develop an initial model to explain this phenomenon. Materials direct teachers to lead a discussion with a list of several vocabulary words in mind. During this discussion, teachers lead students to a shared understanding of the definition of each word, and each word is added to a word wall.

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

- Materials provide embedded support for the teacher in how to introduce and scaffold students' development of scientific vocabulary. For example, in the Teacher Handbook, the section Developing Scientific Languages details the approach of embedding vocabulary within the students' experience. It states, "In each lesson, we want students engaging in practices around a question that they feel a genuine need or drive to figure out. Front-loading vocabulary hinders this process and also puts up barriers on emergent multilingual students to engage in class discussions. This approach to vocabulary building doesn't undermine the sensemaking of students, nor defeat the goal of figuring out important science ideas in each lesson. We want to give students a rich opportunity and experience to wrestle with developing these important science ideas before introducing vocabulary to represent an abbreviated description of those ideas."
- For example, in Unit 4, Lesson 1, students analyze how the Sun aligned with human-made structures on a particular day of the year and develop an initial model to explain this phenomenon. Materials direct teachers to lead a discussion with a list of several vocabulary words in mind. During this discussion, teachers lead students to a shared understanding of the definition of each word, and each word is added to a word wall.
- For example, at the beginning of each unit, there is a list of key vocabulary and in which lesson it should be introduced. Materials direct teachers to add each vocabulary word to the unit's word wall after the class has developed a shared understanding of their meaning: "The Word Wall becomes an ongoing collection of words we will continue to use, including all the words we earn in the unit and possibly a few key words we encounter." It also connects words from other units.

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

- Materials provide teacher guidance on preparing for student discourse and supporting students in using evidence. For example, in the Teacher Handbook for eighth grade, there are Questioning Strategies to Support Discussions provided. The units suggest four questioning strategies for teachers to use to promote student discourse. These questioning strategies are intended to surface, challenge, and move forward student thinking while also fostering a community of science learners. These strategies are 1) Elicit questions, 2) Probe or clarify questions, 3) Challenge questions, and 4) Questions to support science discourse.
- For example, in Unit 8.7, Lesson 3, teachers are guided to help students answer the question, "What causes this kind of precipitation event to occur?" Teachers are guided to motivate students to share related phenomena and record additional questions they might have about their investigations, gather in a Scientists Circle and discuss similar questions the students might have and discuss and share them. Teachers are also provided guidance on how to support students in engaging in asking questions and defining problems as a whole class or small group.
- For example, in grade 8.8, Lesson 14, Day 1, students calculate their carbon footprint and compare it with other students and the American average. The teacher is given prompts on the slide to facilitate a discussion of the different actions that students thought they could make, how those actions impact carbon, and other considerations to think about before making a change.

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

- Materials provide teacher support and guidance to engage students' thinking in various modes of communication throughout the year. For example, in Unit 9, Lesson 13, teacher resources provide exemplars of students' verbal responses for sharing their thinking. The teacher facilitates a discussion to conclude that orangutans have a special role in dispersing fruit seeds in the tropical rainforest. The seeds, which become new plants, are important for many tropical rainforest populations. Fruit trees depend on orangutans to disperse their seeds. Materials provide teachers with key ideas, what to look/listen for, as well as suggested prompts for questioning, sample student responses, and follow-up questions.
- For example, in grade 8, Lesson 8.1.04, teachers are provided a learning plan snapshot with time stamps for facilitation. Students are given a prompt to respond to regarding a technology company that claims to have designed a foldable phone that has an unbreakable screen. This prompt is after an investigation into how objects change shape after a collision based on material and force. The students are given a graphic organizer to complete whether they agree/disagree and based on what evidence. They then have to collaborate with a partner and discuss and annotate their thoughts.
- Materials provide feedback tips and examples teachers can use to support students throughout the learning cycle. For example, in Unit 1, Lesson 11, students develop new phone case criteria and constraints. They draft a design to protect a cell phone and then share their designs with a partner in order to give and receive feedback on their designs. The teacher sets a timer for four minutes. Each person has four minutes to explain their design and receive feedback. Partner #1 explains their device to Partner #2. Partner #2 will then give feedback to Partner #1 until the timer goes off. As students give feedback, they are to focus on key questions posed by the teacher.
- Materials provide teacher support for how to enable students to construct and present a verbal or written argument to problems using evidence acquired from learning experiences. For example, the materials use three specific types of communication in scientific ways. First, Initial Ideas' purpose is for students to share initial ideas/experiences, make connections between peer observations and real-world experiences, and provide a chance to share and make sense of ideas. Second, Building Understandings' purpose is for students to share, connect, critique, and build on others' findings, claims, evidence, and explanations and provide the teacher and students with opportunities to clarify identified problems and which ones need further investigation. Lastly, Consensus' purpose is for students to collectively work towards a common explanation.

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Indicator 6.1

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

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

Meets| Score 2/2

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

Materials include a range of diagnostic, formative, and summative assessments to assess student learning in a variety of formats. Materials assess 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 with recurring themes and concepts. Materials include assessments that require students to apply knowledge and skills to novel contexts.

Evidence includes but is not limited to:

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

- Material consistently provides formative and informal assessment materials. For example, the Assessment Tab includes summative assessments that include formal opportunities to assess student learning.
- The variety of formats includes TEKS and Unit themes assessed with diagnostic benchmarks, lab scoring criteria, evidence notebooks, and Unit Readiness Checks. Formative Unit A/B assessments are available in all units, as well as summative Unit assessments that assess all TEKS.
- Other formative assessments in materials include Lesson Check and Lesson Check on ED at the end of every lesson. Informal assessments are also given throughout the lessons, with student checks for understanding by raising their hand or answering questions verbally. Unit Performance Tasks are included in materials to provide summative assessments.
    - For example, in Unit 7, students learn about weather, climate, and water cycling. Lesson 13 has students create a model to explain why some storms produce hail and others don't and answer other storm-related questions. The lesson includes a summative

assessment in which students are asked to use what they have figured out to demonstrate their learning to explain air and water movement in a hurricane. Teachers are provided with notes to evaluate student responses.
    - For example, The Teacher Handbook explains that each unit includes a table that summarizes opportunities in each lesson for assessing every lesson-level performance expectation (LLPE). Examples of these opportunities include student handouts, home learning assignments, progress trackers, or student discussions. Most LLPEs are recommended as potential formative assessments. The system is designed to support a quick review of the LLPE, assessment guidance, and a subset of student work to help inform instructional decisions throughout the unit, even if you are not assessing each student individually every time.
- In grades 6-8, the teacher handbook states, "The system has assessments embedded in the unit, options for self- and peer-assessment, and multi-component tasks." One of the five assessments is the pre-assessment. They are in the form of initial models and DQB questions. For example, the teacher facilitates a whole-class discussion by calling on student volunteers to share their noticings and wonderings from the reading, photos, and videos. What is shared is recorded on the class Notice and Wonder poster. Teachers can assess students' initial questions on Day 2 as the class constructs the Local Hazards poster and the Technologies or Related Solutions poster or on Day 3 as the class constructs the DQB.

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

- Materials include detailed lesson plans that outline how the materials can be used to teach specific concepts and skills and provide guidance on how to assess all of the student expectations.
    - For example, there is a grade 8 TEKS alignment chart that indicates which TEKS are taught and assessed in which units within the lessons. A "Learning Plan Snapshot" is provided for each lesson. This document includes a summary of student expectations for each part of the lesson.
- Materials assess student expectations over the breadth of the eighth-grade science curriculum and indicate which student expectations are being assessed in each assessment.

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

- Materials include assessments that integrate science concepts with recurring themes and concepts.
    - For example, on the lesson assessment in 8.2.14, students are asked to develop a model using words or pictures to show how hitting a cymbal loudly would damage a musician's ears, explain what is happening in the model, and use key ideas and evidence to support the argument.
    - For example, on the lesson assessment in 8.5.17, students are asked to have a class discussion and create a graph of the data. Use the data from the study and what was investigated in the unit about how genetic and environmental traits affect organisms to explain: "How does this study mapping the heights of coast redwood trees help us understand what factors might affect how they grow so tall?"

    - For example, in Unit 8.1, Lesson 1, Day 1, materials provide video access and a speaker to observe up close. Students make noticings, and the teacher asks questions to prompt them to consider what's happening to cause what they notice and how it connects to what they saw in the video. Students develop a model to explain how a sound source (cause) can make another object move (effect). Student initial models should be considered a pre-assessment.
- Materials include assessments that integrate science and engineering practices with recurring themes and concepts.
    - Materials include "Making Sense of Phenomena," which is part of a formative assessment outline in all lessons that gives students the chance to revisit anchoring phenomena and apply Claims, Evidence, and Reasoning models to demonstrate learning. Remediation for struggling students is given to teachers, which helps students connect investigative phenomena back to anchoring phenomena.
    - For example, at the end of each lesson and unit, there is an evaluation of a model, reexamination of the DQB, and/or assessment document that allows students to make connections and wrap up their learning for mastery.

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

- Materials consistently require students to apply knowledge and skills to new situations. Some questions in the quizzes and tests require the application of knowledge and skills.
    - For example, a two-part question in the unit test (Test A) in the Properties and Systems of Matter Unit requires students to apply their knowledge about the particle model of matter, the law of conservation of mass, and their understanding of the use of models to predict which chemical reaction supports the claim that mass is conserved and which statement best justify their selection.
    - For example, a question in Quiz A in the Models of Matter lesson in the Properties and Systems of Matter Unit requires students to apply their knowledge about homogenous and heterogenous mixtures, their knowledge about particle nature of matter, their knowledge of elements and compounds and their skills in using models to identify each matter sample described in the given models as homogenous or heterogenous mixtures.
- Materials include lessons that have a driving question that has to be answered by the student in a summative response. The students apply the concept learned to real-world problems, thus helping the teacher assess the learning of the students.
    - For example, in the lesson Models of Matter, students learn about homogenous and heterogenous mixtures and have to use bolts, nuts, and washers to model the mixture and explain why they chose the combination they did.

Kiddom OpenSciEd Grade 8

Indicator 6.2

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

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

Meets | Score 2/2

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

Materials include information and/or resources that provide guidance for evaluating student responses. 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. Assessment tools yield relevant information for teachers to use when planning instruction, intervention, and extension. Materials provide a variety of resources and teacher guidance on how to leverage different activities to respond to student data.

Evidence includes but is not limited to:

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

- Materials consistently include information that guides teachers in evaluating student responses. In grade 8 Unit Assessments, there is a Teacher Answer Key provided at the end of the unit. The key provides a rubric for grading responses and how to evaluate the answers that are provided by students. Teachers are provided with Notes for Evaluating Responses after every question. This guidance provides teachers with knowledge of what the student is thinking and how to evaluate based on different responses that could be received.
    - For example, in Unit 7, students learn about weather, climate, and water cycling. Lesson 13 has students create a model to explain why some storms produce hail and others don't and answer other storm-related questions. The lesson includes a summative assessment in which students are asked to use what they have figured out to demonstrate their learning to explain air and water movement in a hurricane. Teachers are provided with notes to evaluate student responses.
    - For example, in Unit 8, students are tasked with developing a resilience plan for their community in case of a natural disaster. Students work in groups to design resilience plans that contribute to the long-term rebalancing of carbon and also prepare the community for change. They are required to provide feedback to other groups and

evaluate their own plans by asking questions. At the end of Lesson 17, students complete a self-assessment to evaluate their progress. Teachers are provided with "what to look for" in student responses.

- 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. In grades 6–8, lessons have suggested prompts, sample student responses, and follow-up questions to support teachers with informal and formative assessments.

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 provide guidance documents and resources to support teachers' analysis of assessment data. According to the Teacher Handbook, each unit includes an assessment system that offers many opportunities for different types of assessments that work together to help teachers inform instruction throughout the lessons. Types of assessments include pre-assessments, formative assessments, self-assessments, summative assessments, and peer assessments. Each unit has identified these key moments of assessment and has included them, along with assessment and scoring guidance, in the Assessment Overview Table at the beginning of each Teacher Edition and within the keys and rubrics associated with lessons.
    - For example, in Unit 5, Lesson 13, students are asked to complete an exit ticket. The purpose of the exit ticket is to assess student understanding of how plants reproduce. Students are asked to complete a diagram and respond to a prompt. Teachers are provided with a key that provides sample student responses to the diagram as well as the prompt. The key provides teachers with points to be included in student responses to the prompt.
- Materials provide questions or prompts for teachers to reflect upon while examining patterns in the data.
    - For example, in Unit 8.1, Lesson 4, Day 2, the teacher is given examples of questions to use to help students organize and link evidence in support of their claim and to consider strategies for arguing persuasively for the validity of their claim.
    - For example, in Unit 8.1, Lesson 2, Day 2, If students struggle with identifying any causes, the teacher models the completion of a cause-and-effect statement using understanding from a previous unit.

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

- The information gathered from the assessment tools helps teachers when planning differentiated instruction.
    - For example, the Lesson 8.2 assessment rubric gives the teacher guidance to identify if a student has mastered the content. The indication of + or ++ determines the level of mastery: if several ideas marked with a + are missing, this may indicate that a student may be struggling. If several ideas are marked with ++, then this indicates that a student is bringing a deeper understanding.

    - For example, in Unit 8.1, there is a formative assessment opportunity and attending to equity section provided that gives teachers guidance on how to differentiate their lessons. For example, in question 3b of the assessment, students are asked to support or refute their claim by citing evidence from investigations they did and using any related science ideas they developed to defend their argument. Offering students a choice in modality to share their explanations provides equal access for all students. Some students may benefit from drawing a representation of the potential collision results when one cheerleader collides with another and labeling it to support why they think this. As another alternative, some students may find more success explaining this orally by recording themselves and then turning in the recording or presenting it to the class or to the teacher during an appropriate time in the classroom.
- The information gathered from the assessment tools helps teachers when planning core instruction. For example, in Unit 8.1, there is an additional guidance section that suggests ways to make instructional decisions (e.g., grouping students [pairs, small group, individual and whole class], how to set objectives and suggested prompts to facilitate student discourse, and what skills should be focused on during each section of the lesson)
- Materials provide suggestions for teachers to consider regarding the potential need for whole class review or reteaching. For example, teachers can reference the teacher guide during Unit 8.2, Lesson 1, Day 1 for an assessment opportunity. Teachers are instructed to monitor students developing their model listening and asking probing questions. Then, they can use the students' initial models as a pre-assessment to learn where students are coming in and what ideas they have to build on in the unit.
- Materials include self-reflection questions for teachers to use after analyzing and interpreting data.
    - For example, in Unit 8.6, Lesson 3, Day 1, students work with the present lesson's data in a subsequent lesson set to make evidence arguments for lines of descent and common ancestors.
    - For example, in Unit 8.6, Lesson 5, Day 2, if students are struggling, the teacher guides them to revisit the cards for their organism. The teacher has question prompts to facilitate a deeper discussion with those students.

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

- Materials provide a variety of student resources for teachers to use in responding to performance data.
    - For example, some units (e.g., Unit 1) have additional lessons added to the end of them. Teachers can choose from two or more lessons in order to extend the unit. All additional lessons include lesson assessments. Teachers are provided with answer keys that include discussion prompts and sample student responses.
    - For example, students are assessed in Unit 8 as they are asked to analyze graphs and charts from multiple claims to identify the similarities and differences in patterns to determine that changes in the environments are caused by increasing temperatures. Materials provide teachers with an extensive answer key that includes what student responses should include. Teachers are also provided with direction as to what to do if a student has not mastered any of the concepts assessed on the test.
- Grades 6–8 lessons provide direct instruction of science concepts, followed by reviews of application to those concepts, including creating and revisiting the DQB. Materials provide

documents to support teachers in developing action plans to document teacher-provided supports designed to accelerate learning and academic growth. Materials suggest ways to reteach through prompts as well as extension activities to deepen understanding.

Kiddom OpenSciEd Grade 8

Indicator 6.3

Assessments are clear and easy to understand.

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

Meets| Score 2/2

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

Assessments contain items that are scientifically accurate, avoid bias, and are free from errors. Assessment tools use clear pictures and graphics that are developmentally appropriate. Materials provide guidance to ensure consistent and accurate administration of assessment tools. Materials include 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 items that are scientifically accurate. Formative and summative assessments include assessment items that align with taught objectives and present grade-level content and concepts, science and engineering practices, and recurring themes and concepts in a scientifically accurate way.
    - For example, in Unit 8.5, a lesson assessment contains assessment tasks that have students refer to redwood trees that are grade-level appropriate to support their explanations.
    - For example, in Unit 8.4, Lesson 12, Day 1, students are reminded that light can be either transmitted, absorbed, or reflected by matter it interacts with (light does not hit...).
    - For example, 8.2 contains an accurate representation of types of waves in the appropriate scenarios.
- Assessments contain items for the grade level that avoid bias. Formative and summative assessments include assessment content and examples in a fair and impartial manner with no impact on student performance based on such factors as a student's home language, place of origin, gender, or race and ethnicity.
    - For example, in Unit 8.7, individual assessment items apply to what students learn about average water vapor and land surface temperature of tropical rainforests. Information is given on the assessment task to make it fair for all students.

- For example, in Unit 8.5, Lesson 17, information about redwood trees and the specific environmental conditions that support their growth is given on the assessment task to make it fair for all students.
- For example, in Lesson 8.7, the assessment uses background knowledge from lessons for students who may not have experience with geographic locations and rainforests.

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

- Assessment tools use clear pictures and graphics. Images in lessons are authentic photos as well as clearly labeled diagrams to enhance student and teacher guidance.
  - For example, 8.6.1 uses embedded assessment that is targeted at analyzing displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
  - For example, in Unit 7, Lesson 22, students are assessed by completing assessment tasks. In one task, students are expected to use what they learned about climate to predict the location of rainforests based on what they learned, which might contribute to the location and climate of rainforests. Students are provided with two maps to inform their predictions. This task is one of several different tasks in which students must analyze the graphics provided in order to complete a task or answer a question.
  - For example, in Unit 8.5, pictures of maps along Bull Creek, in a creek valley, tall redwood trees, and histograms showing a range of their heights that are clear and support answering the assessment tasks.
- Assessments contain pictures and graphics that are developmentally appropriate.
  - For example, in Unit 8.7, materials contain pictures and graphics of average water vapor and average land surface temperature of tropical rainforests that are developmentally appropriate with enough detail for learning the science content but without excessive detail that would overwhelm a middle school student.
  - For example, in Unit 8.2, Lesson 14, Day 2, materials contain graphics of a hearing loss process without detailed anatomical renderings.
  - For example, in Unit 8.4, Lesson 11, students are predicting overlapping beams of light using a simple diagram to display the concept.

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

- Materials provide consistent guidance to ensure consistent and accurate administration of assessment tools.
  - For example, the Teacher Handbook explains that each unit includes an assessment system that offers many opportunities for different types of assessments that work together to help teachers inform instruction throughout the lessons. It goes on to explain each type of assessment offered and how the teacher should use each type of assessment to gauge student progress.
  - For example, the Teacher Handbook gives examples of how to use the DQBs as formative assessments. Also, it relays the two structures that teachers can use during any unit, allowing teachers the flexibility to customize for their local context.
- Materials include detailed information that supports the teacher's understanding of assessment tools and their scoring procedures.

- For example, the Answer key for the assessment in 8.4.4 helps teachers to identify different ideas that students should (or could) include in their responses. It also provides guidance for how to move forward if a student is missing key ideas in their response.
- For example, Lesson 8.2 has a distinct section in the Teacher's Guide on assessment that includes an example of a scored performance assessment with an explanation for each of its components.

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

- Materials offer accommodations for assessment tools so that students of all abilities can demonstrate mastery of learning goals. For assessments, materials state, "Some students may benefit from using multiple modalities to show their thinking for any or all of the questions on this assessment. You may consider allowing some students to present their answers verbally with you or another student acting as a scribe to record their thinking on paper. Other students may benefit from using gestures rather than images to describe parts of their models. Some students might also benefit from using manipulatives to represent parts of the model and to support a written or verbal explanation of what's happening in each part of the model. In each case, encouraging students to use multiple modalities to show their thinking creates a clear, accessible, equitable pathway for all students to demonstrate proficiency."
- The Teacher Handbook states that materials provide teachers with guidance on how to adapt the materials for their students; these strategies are discussed in the teacher guide in educative boxes titled "Attending to Equity." These educational boxes are embedded within the lessons in each unit to provide specific and just-in-time support for teachers.
- All eighth-grade Assessments provide a personalized feature that allows teachers to differentiate assessments for the students based on accommodations.
- Materials provide a drawing feature so students can write or draw on graphics and pictures in an assessment.
    - For example, in the Unit 8.5 assessment, students can draw in the organizer and maps to complete the assessment.

Kiddom OpenSciEd Grade 8

Indicator 7.1

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

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

Meets | Score 2/2

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

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

Evidence includes but is not limited to:

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

- In grade 8, lessons include recommendations for additional guidance to support students who have not yet achieved mastery. Suggested prompts, sample student responses, and follow-up questions are provided if students don't bring up what they noticed happening to help elicit that line of observation. For example, in grade 8, Unit 8.5, Lesson 17, there is an assessment opportunity. It states what to do if students need extra support on the assessment.
- The teacher handbook includes strategies for supporting equitable participation during instruction. For example, “in eliciting initial ideas or initial questions, the goal is to get as many ideas on the table as possible. Consider asking students to “write and pass” a sheet of paper around their group until they have at least ten items. That way, all students get a chance to contribute, to see others’ ideas, and to add their thinking in a low-stakes way. Make sure to let students know that these ideas can be expressed in different ways (e.g., pictures, graphs) and that they are not limited to words in English.”
- Materials ensure that teachers can target instruction to reteach skills necessary to access grade-level content and “attend to equity.” For example, in Lesson 8.03.02, teachers are directed to evaluate students who need more support for their claim and are given examples of student products, like just answering no/yes/maybe without effect and reasoning. Then, teachers are given support for what to do in the next lesson to reteach non-mastery.

Materials provide enrichment activities for all levels of learners.

- Materials are designed to promote equitable access to high-quality science learning experiences for all students. The materials include enrichment activities that contain challenging activities

and assignments that extend beyond the regular curriculum and stimulate critical thinking, problem-solving, and creativity. In grade 8, there are alternate activities which include extension opportunities. In Unit 8.5, Lesson 17, there is an extension opportunity provided to students who might be interested in obtaining and evaluating more information about how the amazing redwood trees can sometimes but not always contend with changes to their environment.

- In Unit 8.9, Lesson 12, there is an extension opportunity provided to students to deepen their understanding of mutually beneficial relationships and extend the ideas to other cases students know about or are relevant in their community. In Unit 6, Natural Selection and Common Ancestry, there are suggestions in Lesson 1 for teachers to support students in map reading to orient students to the corresponding locations on their own globes. Physical objects and spatial models help to convey perspective and can support various methods of representation. This extension benefits learners who have shown mastery of the current lesson content, and all students can increase their understanding of the lesson's relevance.
- Materials provide enrichment activities that account for learner variability. Online materials include a variety of real-world scenarios students can explore based on their interests in particular areas of science or community needs. For example, materials include opportunities for students to identify various STEM careers related to the study of choice, conduct independent research on STEM careers and related resources, evaluate and analyze various STEM career resources, and develop an understanding of how STEM careers impact society and the world.

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

- Materials include questions for the teacher as a means of supporting students when they struggle to maintain engagement on a self-engaged demanding task. For example, in the grades 6–8 lesson daily overview, teachers are provided with suggested prompts and possible student answers to re-engage students when struggling with a task without lowering the cognitive demand of the task. Lessons include a variety of student activities that are assigned based on the achievement of the student's mastery of the SEPs and content knowledge.
- For example, each lesson includes a “Learning Plan” in the teacher's edition. Learning Plans are comprehensive, including example questions to ask at particular points in the lesson and example student responses. Materials include recommendations for collaborative exploration and/or scientific experimentation rooted in SEPs. The program is sequenced to enable units to build on what students have developed in prior units while supporting the development of CCCs and SEPs coherently across the program.

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Indicator 7.2

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

1	Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content.	M
2	Materials consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one).	M
3	Materials consistently support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation.	M
4	Materials represent a diversity of communities in the images and information about people and places.	M

Meets| Score 2/2

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

Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content. Materials consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one). Materials consistently 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 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.

- Materials include opportunities for students to engage in phenomena-based learning activities that include models, graphic organizers, and consensus discussions. For example, the lessons in the units provide opportunities for student-led investigation and modeling. Students also create and answer discussions related to the course level.
- Lessons include video clips to introduce and reinforce specific science concepts. For example, as a follow-up to Unit 8.1, Lesson 2, Day 1, students explain the objects involved in the three different collisions that are shown in a video. Students create a T-chart for recording observations in their notebooks. In Unit 8.5, Lesson 2, students discuss muscle structures after viewing a muscle contraction video.
- The materials include an investigation question that drives learning for the unit and lesson. An explanation of how teachers can use the driving question within sense-making discussions is included. The Teacher Handbook provides a detailed list of strategies for supporting equitable participation during discussions. The handbook also provides teachers with ways to use Scientists Circles to support an equitable science classroom. For example, all units present

multiple opportunities for student-led investigations, questioning, and discussions related to the student's course level.

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

- The Teacher handbook gives teachers strategies for actively using and reinforcing community norms. The strategy suggests that teachers give students time to reflect on the norms individually and discuss them as a class, as well as in pairs through "partner check-ins."
- In Unit 5, Lesson 1, students listen to a story, brainstorm, and develop a whole-group record. They work individually to observe and compare, review, make predictions, and create initial models. Students work in small groups in Scientist's Circle and discuss their observations.
- In Unit 2, Lesson 1, Day 1, students create initial models (individually) to explain a phenomenon. To support student discussion and writing, sentence starters on posters can be especially useful for helping students engage in scientific talk, particularly students who may feel reluctant to contribute. They can also help students write about their observations, analyses, and explanations.

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

- The Teacher Handbook provides information on the importance of providing multiple opportunities for students to learn from each other in science classrooms.
- Materials consistently support student engagement in collaborative learning structures, such as think-pair-share, while learning new concepts. For example, the Teacher Handbook states that "materials rely on students collectively figuring out science ideas together through productive discourse and classroom talk."
- In grade 8, lessons provide opportunities for students to work in collaborative groups and whole-group guided learning to answer the unit question through investigation and preset norms. For example, in Unit 8.7, students record and share noticings and wonderings from three video clips of hailstorms.
- A Driving Question Board (DQB) is used at the beginning of each unit to capture what individual students are wondering about anchoring phenomena. The DQB is then revisited throughout the unit to document the progress students are making and to launch deeper investigations and problem-solving. Independent opportunities for students to examine recent scientific case studies and complete a reflection, argument, summary, or justification assignment support multiple types of student learning.

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

- Materials represent diverse communities using images and information that are respectful and inclusive. For example, in Unit 8.4, Lesson 1, the names of individuals presented in assessment items equally include male and female names and represent individuals of diverse backgrounds, including races, ethnicities, and national origins.
- Teachers are provided with a standard set of norms in the first units of each grade level. For example, "We recognize and value that people think, share, and represent their ideas in different ways." In Unit 1, Lesson 16, students develop a presentation to share with potential investors about the merits of their design to protect fragile things from breaking. Students present their design ideas to investors. This project provides students an opportunity to bridge

the classroom and community: “The community will consist of stakeholders for almost every device, and this will provide a real-world opportunity for students to present a meaningful solution to stakeholders from various backgrounds.”

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Indicator 7.3

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

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

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials include listening, speaking, reading, and writing supports to assist emergent bilingual students in meeting grade-level science content expectations.

Materials include guidance for linguistic accommodations (communicated, sequenced) 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.

- Materials include linguistic accommodations commensurate with various levels of English language proficiency as defined by the ELPS.
    - For example, materials include teacher guidance for communication with English Language Learner (ELL) students, with the goal of creating comprehensible input for various levels of English language proficiency. Materials accommodate emergent bilingual (EB) students through visuals, realia, gestures, sentence stems, graphic organizers, anchor charts, and manipulatives. Materials lack specific scaffolding for each language proficiency level (Beginning, Intermediate, Advanced, and Advanced High).
    - For example, the teacher handbook includes two primary ways to support ELLs. First, through the curricular design and pedagogical routines, and second, by the educative boxes embedded in the teacher materials.
- Materials encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English. In Unit 1, Lesson 2, students explore colliding objects and record observations about changes in their motion and shape. Materials suggest accommodating students who have difficulty using words by having them draw pictures of what they observe.
- In the Course Unit Storylines and Teacher Guides, information is included as a resource for teachers as a guide in using the instructional model to accommodate multilingual learners. The following is a direct quote from the text, "OpenSciEd Instructional Model: The instructional routines that make up the OpenSciEd Instructional Model provide many scaffolded

opportunities for multilingual students to practice talking in partners, small groups, and then finally as a whole class. Activities include options for students to express their ideas in many ways, with an emphasis on students using both linguistic (e.g., talking and writing) and non-linguistic (e.g., drawing, graphing) resources to share their thinking."

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

- Materials encourage strategic use of students' first language as a means to linguistic, affective, cognitive, and academic development in English**.**
    - Materials include tips for teachers about the importance of allowing students to express their understanding in their first language. The Teacher Handbook states, "Teachers should encourage students to express their ideas in language and discourse styles that they are comfortable with in order to open the conversation and sensemaking to all students."
    - For example, in Unit 1, Lesson 2, students explore colliding objects and record observations about changes in their motion and shape. The materials suggest accommodating students who have difficulty using words by having them draw pictures of what they observe.
    - For example, materials include teacher guidance for communication with emerging multilingual learners (EMLs) with the goal of creating comprehensible input. According to the Teacher Handbook, lessons include "educative boxes focused on EMLs, often appearing as supplemental text on the margins of lesson plans.
    - For example, phenomenon-driven science instruction provides EMLs with authentic contexts and purposes for which to use their developing language(s) and supports students in making sense of the phenomenon being explored. Understanding the role of language in sensemaking includes valuing the assets EMLs have as well as knowing forms and features unique to each science and engineering practice.
    - For example, in Unit 8.1, Lesson 2, Day 1, Attending to Equity: Supporting Emerging Multilingual Students, students use multiple words and images to clarify what is meant by "damage." Teachers are directed to ask ELL students what their home language term is to look for similarities. For example, in Spanish, a damaged thing is dañado(a), and in French, it is endommagé.

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Indicator 7.4

Materials provide guidance on fostering connections between home and school.

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

Meets | Score 2/2

The materials meet the criteria for this indicator. Materials 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 be shared with students and caregivers about the design of the program.
    - For example, the teacher handbook provides some information about the use of the science storyline approach, what it entails, and the process of the routines. The course storylines provide a brief overview of each unit in the course. Materials suggest that teachers assign lessons to promote a home/school connection. Teachers are encouraged to tell students to share the storylines and explain phenomena and/or how they solved a problem; however, materials lack resources for ongoing interactive feedback or progress sharing between school and home.
    - For example, at the beginning of Unit 1, Contact Forces, teachers print a unit “Storyline.” A unit storyline is a logical sequence of lessons that are motivated by students' questions. It is a science storyline because the questions arise from students’ interactions with phenomena. They are designed to provide students with the goal of explaining a phenomenon and/or solving a problem.
    - For example, the Unit Storyline provides the Lesson Question, Phenomena or Design Problem, what the students do and figure out, and how they represent it. It also discusses how students will engage with each of the phenomena presented in the unit.

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

- Materials provide information to be shared with caregivers for how they can help student learning.
    - For example, in Unit 8.3, there is a Home Learning lesson. In the lesson, it instructs the students what to do at home with their caregiver to reinforce the unit question they are looking to answer.
    - For example, in a unit about Earth's resources and human impact, students observe two news clips that tell the story of extreme flood and drought events in two different communities. After viewing the clips and discussing what they saw, teachers ask students to go home and talk to members of their family and/or community to find out answers to the following questions: “Has our community experienced anything like this? Have you or your family lived in or traveled to a community that experienced anything like this? Has a member of your family or community experienced anything like this?” Students are encouraged to bring the stories back to their next class to share.
- The teacher handbook provides a safety acknowledgment to send home with students to share with parents and/or caregivers. The acknowledgment encourages students to go through the safety practices with their parents/caregivers to help create a safe learning environment in science class. The following is a direct quote from the handbook, “Prior to the first science investigation of the year, a safety acknowledgment form for students and parents or guardians should be provided and signed.”
- Home communication letters found at the end of the unit overview are provided for teachers as a resource to share with caregivers how they can help student learning. The following is a direct quote from the resource, “Helping your child make sense of their learning: There is no pre-teaching vocabulary because words often have multiple meanings, and are often easier to remember once students have some experience with it; therefore, ask your child to recall evidence or experiences to help elaborate on what their ideas and explanations are. Encourage your child to connect how their models or drawings help explain their ideas about the one-way mirror phenomenon. Ask your child how different structures or parts interact with other structures within their models. Ask your child what question(s) they are working on currently, and how the class has made progress so far. If your child sees the phenomenon or a similar phenomenon outside of school, encourage your child to record it and share it with the class, or explain to you what they think is happening.”
- For example, the Unit 8.1 Overview Materials contains a home communication letter at the end in both English and Spanish.

Materials include information to guide teacher communications with caregivers.

- Materials include adequate teacher guidance for communicating with caregivers. For example, Unit Storylines provide a brief overview of each unit in the course. To promote a home/school connection, these materials can be assigned to students to share with their families. Teachers encourage students to share the storylines explaining the phenomenon and/or how they solved a problem with their caregivers. For example, in Unit 4, on Earth in Space, a storyline is provided before the unit begins.
- Found in the science course Unit Storylines and Teacher Guides is a video resource provided for teachers that guides them through communicating with parents and caregivers.

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

Partial Meets | Score 1/2

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

Materials are somewhat 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, scientific and engineering practices, and recurring themes and concepts. Materials provide review and practice of knowledge and skills spiraled throughout the year to support mastery and retention.

Evidence includes but is not limited to:

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

- The handbook explains that the sequence of activities is designed to make sense to students using “Storylines,” which provide a brief overview of each unit and a logical sequence of lessons.
- The materials do not include a cohesive scope and sequence that shows how science knowledge and skills are addressed over the course of the entire year.
- There is a progressive order of lessons for teachers to follow as outlined in the TEKS correlation document for the eighth grade that displays the TEKS and the location of the TEKS within each unit.
- There is an ELPS correlation document for the eighth grade that displays each ELPS and the location of the ELPS within each unit.

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

- Each grade 8 unit has specific science and engineering practices (SEPs) that will be the “focal” practices for that unit. Within the storyline, the teacher is guided on how to engage each student with SEPs.
- At the beginning of each grade 8 unit, students review the previous unit and preview the unit that will follow. Students are asked to make connections between units. Students take the ideas learned in multiple units and make connections to the current phenomenon.

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- Eighth Grade Materials provide integrated instructional resources that use crosscutting concepts (CCCs) to scaffold instruction for each unit. For example, highlighted boxes on the sidebar column highlight CCCs.
- Every unit contains a section called “Setting the Stage for Learning.” Within this section, it guides the teacher in prerequisite lessons that may need to be revisited prior to the beginning of the unit.

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

- Each unit contains a Unit Storyline for the teacher to follow. Within the storyline, the teacher is guided on how to engage each student with SEPs.
- In Lesson 8.3.12, students revisit the Driving Question Board (DQB) to reflect on which questions they can now answer and their own newly developed ideas about the concept. Students are given time to assess their learning thus far.
- In the “Putting it All Together” section of the unit, teachers review previous units and preview upcoming concepts at the start of each new unit.
- The T*eacher Handbook* suggests that when teachers introduce an “Anchoring Phenomenon,” teachers encourage students to identify related phenomena from their personal experience or prior knowledge.
- Connections to previous content/units are included throughout units to draw on students’ understanding of the material that was previously covered in order to support mastery and retention.
    - For example, in 7.5.20 Navigation, it says, “We started to think about a new problem in our community. We made some initial wonderings about it. Share with the class: How do we think this new problem could be similar to or different from the palm oil and orangutan problem?” And in 7.6.15, Examine the Impact of Solutions on Earth’s Systems, it says, “Look at the Earth’s Systems Model that we developed in Lesson 11 and decide where our ‘likely solutions’ would have an impact.” And again, in 8.5.17, Navigation, it says, “What did we figure out in the last lesson?”

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Indicator 8.2

Materials include classroom implementation support for teachers and administrators.

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

Meets | Score 2/2

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

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

Evidence includes but is not limited to:

Materials provide teacher guidance and recommendations for use of all materials, including text, embedded technology, enrichment activities, research-based instructional strategies, and scaffolds to support and enhance student learning.

- The *Teacher Handbook* gives instructions for developing and using science and engineering practices (SEPs), crosscutting concepts (CCCs), and anchoring phenomena.
- The *Teacher Handbook* provides overviews of features of the OpenSciEd units. It includes assessment guides, lesson implementation guides, and progress monitoring guides.
- Teachers are provided with editable lesson resources, including lab instructions, keys and rubrics, and example questions to ask at particular points in the lesson and example student responses.
- At the beginning of each lesson, teachers begin with “What Students Will Do,” then continue into the Lesson Learning Plan Snapshot, which reviews the summary and materials needed per student, per group, and per class.
- In Materials Preparation, teachers are provided with embedded technology, research-based instructional strategies, and scaffolds to enhance student learning.

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

- The Teacher Handbook gives instructions for developing and using science and engineering practices, crosscutting concepts, and anchoring phenomena. On the presentation slides that teachers use for planning, charts are included that outline alignment to Science and Engineering Practices (SEPs) and Crosscutting Concepts (CCCs) Alignment.
- The Teacher Background Knowledge in Unit 8.9 includes a flowchart that shows what cross-content standards are taught and where they build on other units.
- The eighth-grade materials provide a TEKS alignment document that aligns the eighth-grade TEKS with lessons in the curriculum. For example, students are asked to explain how energy flows through systems. The TEKS alignment document pairs this student expectation with Unit 4, which asks, “How are we connected to the patterns we see in the sky and space?”
- The eighth-grade materials provide students with opportunities to read concept-based articles. Students are also given opportunities to write scientific reports as well as keep accurate, written notes in their digital notebooks.
- In the eighth-grade curriculum, there are units that make up the unit storylines and curriculum for every grade level unit. Within each unit, there are learning lessons. When teachers open up each lesson, the very first section is “What Students Will Do.” This section breaks down the grade-level TEKS that will be taught in context for this lesson for the overall unit. Only TEKS that are taught for this grade level are present.

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

- At the beginning of each lesson within a unit, there is a Lesson 1 Learning Plan Snapshot. The Snapshot contains a pacing guide for the lesson and what materials are needed for every activity. This guide includes videos, diagrams, charts, equipment, and supplies for every part of the lesson.
- Each lesson provides teachers with a materials list that indicates the items needed for each part of the lesson. This list also indicates whether materials should be provided per student, per group, or per class.
- The materials lists include links to vendors of needed items for each grade unit.

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

- In the *Teacher Handbook* in Section O, there is a section about Lab Safety for Science Investigations. It indicates that teachers should follow these lab safety recommendations for any lesson with an investigation. There is a list of seven safety recommendations.
- The Teacher Guide for each lesson guides teachers on how to deal with safety practices for the grade-appropriate use of equipment during the investigation.
- For example, at the beginning of Unit 9, there is a document titled “Teacher Background Knowledge,” in which teachers are encouraged to adopt and practice appropriate safety practices during science investigations. A list of safety recommendations is also provided on this page.

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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.

- Each unit begins with a Learning Plan Snapshot for each lesson. It includes prior knowledge, present objectives, and what the next lesson will entail.
- There is a timeline in the Lesson Plan Snapshot that details how many parts are in the lesson, the duration, a summary of each activity, any slides location, and materials needed.
- The Unit Storyline maps out each lesson within the unit and how many days and minutes it will take to complete the 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.

- In Unit Storylines, teachers are guided through each lesson with a sequence of activities designed as a journey to exploring phenomena that defy easy explanation.
- All phenomena are carefully selected to anchor the Unit Storyline and develop targeted disciplinary core ideas, crosscutting concepts, and science and engineering practices.
- Every lesson has a question to investigate using anchoring phenomena, crosscutting concepts, and science and engineering practices. For example, in the eighth-grade Unit 8.1, Contact Forces, the Unit Storyline begins with the unit question, “Why do things sometimes get damaged when they hit each other?”

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

- Each class/lesson is outlined in the Lesson Learning Plan Snapshot and is approximately 45–50 minutes long. The number of classes needed to complete all eighth-grade units is 231 class days.

- In the Teacher Background Knowledge document, teachers can view ways to adjust units for time constraints if needed. Teachers can also access options to shorten or condense parts of the unit without eliminating important sensemaking for students. On the presentation slides teachers use for planning, notes for “How do I shorten or condense the unit if needed? How can I extend the unit if needed?” are included.
- The Middle School Scope and Sequence document explains how each unit builds on what students have developed in prior units, and how the crosscutting concepts (CCCs) and science and engineering practices (SEPs) build coherently across the program.

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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.	Yes
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 clear and easy to understand.

Materials 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.

- Materials are designed with clear, designated places for important information for teachers.
    - For example, in Unit 8.2, Lesson 1, teacher guides are designed in a way that teachers can locate important information easily for planning and implementation.
    - For example, in Unit 8.2, materials include digital links to previous lessons and important information to guide within the lessons and use boxes and tabbed pages to easily identify important information.
    - For example, each unit has a storyline. A storyline is a lesson-by-lesson summary of the unit with the lesson question, phenomena, or design problem, what students do and figure out, and how to navigate to the following lesson.
- Materials include an appropriate amount of white space and a design that supports and does not distract from student learning.
    - For example, in Unit 8.2, Lesson 2, Day 2, students record their responses to a source of sound prompt. The white space around the questions asked makes content easy to read and comprehend.
    - For example, in Unit 8.4, Lesson 12, Day 2, the answer document uses similar spacing between sections, equal line height in body text, and adequate spacing between paragraphs.
- Student materials are appropriately designed to support student learning. Examples include a clear main subject, topic, or purpose; prominent and clear titles and headings; and subheadings that clearly mark sections.

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

- Materials consistently embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting.
    - For example, in Unit 6.3, students develop a model and explanation to show what they think will happen in the air over the United States at three points in time that could answer questions related to the claims that a forecaster made. The worksheet provides maps on which students are expected to annotate the locations of the different parts of the storm.
    - For example, in Unit 3, Lesson 1, an alternate activity for looking at the components of a speaker is to dissect a speaker in real time. Teachers and students are provided with instructions that include photographs of speaker components and their location within the speaker.
    - For example, the digital materials embed age-appropriate videos for all students to have a deeper understanding of lessons. These videos have links for teachers to enhance language with subtitles and the ability to pause for clarification.
- Materials provide images in lessons that are authentic photos as well as clearly labeled diagrams to enhance student and teacher guidance. For example, in Unit 8.5, the picture of a bull is a real example that enhances students' visualization for those who have never seen one or for the ELL students to make a connection.

Materials include digital components that are free of technical errors.

- Materials include digital components that are consistently free of technical errors.
    - For example, in Unit 8.1, teacher resources are free of spelling, grammar, and punctuation errors.
    - For example, in Unit 8.2, teacher resources are free of inaccurate answer keys on worksheets and assessments.
    - For example, in the 8.2, Lesson 4 4, assessment key, materials are free of wrong answers to problems.
    - For example, the Unit 1 storyline is free of inaccurate content materials or information.

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Indicator 9.2

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

1	Materials integrate digital technology and tools that support student learning and engagement.	Yes
2	Materials integrate digital technology in ways that support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content.	Yes
3	Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate.	Yes
4	Materials integrate digital technology that is compatible with a variety of learning management systems.	Yes

Not Scored

Materials are 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 integrate digital technology in ways that support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content. Materials 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 digital technology and tools that support learning through teacher guidance for using investigations, videos, interactives, and related activities to support student learning.
    - For example, in Unit 8.1, Lesson 1, there is a materials preparation section in the teacher's guide that provides guidance and pacing instructions for embedded video clips, investigations, and instructional activities.
    - For example, in Unit 8.1, Lesson 7, students use a computational simulation to collect additional data on the relationship between changes in mass and speed and the kinetic energy of an object.
- Materials provide guidance for integrating embedded technology within materials as well as tools outside of the materials.
    - For example, grades 6–8 have the option of using a digital notebook if the teacher chooses.
    - For example, in Unit 8.4.1, students answer questions in their science notebooks about how we are connected to patterns in the sky.

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Materials integrate digital technology in ways that support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content.

- Materials provide digital tools for students to engage with recurring themes and concepts.
    - For example, in Unit 8.2, Lesson 1, students watch a truck video of a truck playing loud music. Students make a Notice and Wonder chart of strange patterns that they notice and wonder during the video, then discuss together to create a Driving Question Board.
    - For example, in Unit 9, Lesson 9, students conduct experiments using a simulation, manipulating the amount of food resources (independent variable) over a five-year period to observe how orangutan population sizes increase or decrease (dependent variable).
- Materials integrate digital technology in ways that support student engagement with the science and engineering practices and grade-level content.
    - For example, in Unit 8.2, Lesson 2, students observe slow-motion videos of guitar strings and snare drums and share their observations.
    - For example, in Unit 7, Lesson 1, students observe three video clips of hail falling in different areas of the United States on different days. They develop a model to try to explain what causes this to occur.
- Materials provide opportunities for students to obtain, evaluate, and communicate information using digital tools.
    - For example, in Unit 8.2, Lesson 2, students observe slow-motion videos of guitar strings and snare drums and share their observations.
    - For example, in Unit 8.4, Lesson 3, Day 3, students use a video made with planetarium software to make and record observations of the Sun over the course of a year. Students share initial ideas of the patterns of the Sun in the sky that have happened over hundreds of years.
    - For example, in Unit 8.3, Lesson 5, Day 1, students use a computer interactive to simulate the fields between a magnet and a coil to compare and contrast what happens for both attractive and repulsive forces at two different distances apart. Students make diagrammatic models of the fields and come to a consensus about how to represent the fields.

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

- Materials integrate digital technology that supports teacher-to-student collaboration.
    - For example, teachers can create a digital whiteboard as their DQB. Teachers can use the slide deck as a resource to create images to use with the Digital Whiteboard. Also, teachers can share this presentation with students as an editable slide deck so they can collaborate with each other.
    - For example, in Unit 9, Lesson 1, the teacher shows students a video that provides a brief background on where orangutans live, what they eat, and natural predators. Teachers then pose the question, “How could whether we buy candy have any impact on orangutan populations in the wild?”
- Materials integrate digital technology that supports student-to-student collaboration.
    - For example, in Unit 5, Lesson 8, students investigate several family trees that trace the inheritance of the myostatin gene and notice patterns in the proportion of offspring

with different genotypes and patterns that are dependent on the genotypes of the parents. Students are provided with a digital graphic organizer and are asked to work in a group to count up the total number of offspring for each of the different types of parental crosses and count how many offspring have each of the three different types of musculature phenotypes.
    - For example, in Unit 8.4, Lesson 1, students share their model with a partner and make revisions.

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

- According to the Middle School Program Overview, materials are available free on their website. They can be viewed or downloaded as PDF files or Google Docs to view or copy. The videos, interactive models, and other assets needed for each unit are also available on the website.
- Digital materials are accessible and compatible with multiple operating systems and devices. According to the Design Specifications, instructional materials assume that every classroom has a dedicated computer that can project on a screen or display that is large enough for the entire class to see and has an internet connection that is fast enough to support video streaming. The instructional materials may call for interactive use of computers by students in a ratio of two students per computer, as long as those activities can also be done as a whole class on the dedicated classroom computer.
- Digital materials are accessible and compatible with multiple operating systems and devices and learning management systems. For example, the materials are accessible and compatible with Chromebooks, PCs, iPads, Apple computers, and smartphones.
    - For example, the materials state, “[The publisher] offers science curriculum by OpenSciEd, curricula that promotes learning through discovery on a dynamic digital platform.”
    - For example, the Remote Learning Online Tool Organizer is a list of online tools that focuses on how to use the storyline instructionally when teaching remotely.

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Indicator 9.3

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

1	Digital technology and online components are developmentally appropriate for the grade level and align with the scope and approach to science knowledge and skills progression.	Yes
2	Materials provide teacher guidance for the use of embedded technology to support and enhance student learning.	Yes
3	Materials are available to parents and caregivers to support student engagement with digital technology and online components.	Yes

Not Scored

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

Digital technology and online components are developmentally and grade-level appropriate and sometimes provide support for learning. Materials provide teacher guidance for the use of embedded technology to support and enhance student learning. Materials are available to parents and caregivers to support student engagement with digital technology and online components.

Evidence includes but is not limited to:

Digital technology and online components are developmentally appropriate for the grade level and align with the scope and approach to science knowledge and skills progression.

- Grades 6–8 materials provide information that identifies how digital technology and online components are aligned with the grade-level scope and approach to science knowledge and skills progressions. Materials include a digital teacher guide with live hyperlinks to the other online resources to facilitate planning and make it easy to use.
    - For example, in Unit 8.1, there is a teacher's guide that begins every lesson and explains how to plan out the lesson and how student knowledge and skills will progress throughout the lesson.
- The digital technology and online components are developmentally appropriate for the grade level.
    - For example, in Unit 8.1, there are explanations for the video clips and other digital materials in the teacher's guide for each lesson.
    - For example, in Unit 4, Lesson 6, students ask, “Why do we see the shape of the Moon change?” They observe a moon phase digital interactive and answer questions based on comparing what they see in the interactive to what they see using their 3-D/physical model.
    - For example, in Unit 7, Lesson 14, students watch a video of a weather forecast and record their noticings and wonderings.

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

- Materials provide specific teacher guidance for embedding the technology within lessons and assessments.
    - For example, grades 6–8 unit storylines and lesson plan snapshots provide recommendations for teachers on which days to use technology with students and if there is a time during lessons when the technology would enhance or support student learning. Materials outline recommendations in the unit, week, and daily lesson overview pages.
    - For example, in Unit 5, Lesson 2, students investigate the variation found in wheat kernel coloration to learn this trait is controlled by more than one pigment-producing gene. Materials suggest that Teachers have students practice using the Arm Span Data Set and accompanying online graphing tool.
    - For example, Unit 8.2 provides a teacher's guide for each lesson that references available technologies that enhance the lesson. The links are included in the guide for the teachers.

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

- Within the Course Unit Storylines and Teacher Guides activities, an activity can be assigned by teachers to share with parents and caregivers the technology that will be utilized throughout the course. The information includes a link to a video library for access to videos in each unit of the course. Parents can view a library of the simulations that will be used in each unit as well.
- The following is a direct quote of text included in the caregiver technology information page, “Students will interact with multiple forms of media throughout the course. Simulations and data visualization tools will enable students to create and refine models of their ideas of key scientific phenomena. Embedded engineering practices in units focused on problem-solving and technology emphasize that there is not always one right answer. When having conversations about science, you can encourage your child’s curiosity through talking about their own noticings and wonderings from the technology that they utilize in class. When supporting your students’ use of technology, hold off on providing answers right away for your child; we want students to make progress on their own questions and to think of ways to make sense of what’s around them.”
- Materials provide a Unit Storyline for parents and caregivers on how to support students.
    - For example, in Unit 8.2, there is a Unit Storyline that indicates what the overall Unit question, the lesson question, phenomena or design problem, what students will do and figure out, and how they will represent it.
    - For example, Unit 7 begins with a unit storyline, which is a lesson-by-lesson summary of the unit with the lesson question, phenomena or design problem, what student do and figure out, and how they navigate to the following lesson. Teachers may choose to send this home with students at the beginning of a unit to share with parents.