Great Minds PhD Science Grade 5

Great Minds PhD Science Grade 5 Executive Summary

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

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

Section 2. Instructional Anchor

- The materials are 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 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 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.

Great Minds PhD Science Grade 5

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.

- The materials provide multiple opportunities to develop grade-level appropriate scientific and engineering practices (SEPs), as outlined in the TEKS. To develop SEPs, students first make observations within lessons before they move into more complicated SEPs, such as planning and conducting a lab. In Module 1, Lessons 1–2, students use the anchoring phenomenon of the Chihuahuan Desert to observe and describe features of the desert and then develop models of natural processes that have shaped the Chihuahuan Desert. Students create an anchor evidence graphic organizer to show the processes that form natural earth features. In Module 3, Lesson 1, students use outdoor observations to model and predict the location of the Sun at a particular time of day. Students are instructed to draw a model of how ancient Polynesians could have used celestial objects for navigation during the daytime and nighttime. Students draw their

models and write their explanations in their Science Logbook and share their initial model with a partner or small group to look for similarities and differences.

- Students practice using SEPs during investigations throughout modules. Students build on their knowledge through each lesson section as the SEP begins with observations, moving to models and investigations. Students get to practice and design several investigations throughout modules. For example, Module 1, Lesson 12 provides a conceptual checkpoint for teachers. Students use their model to identify that moving water formed the gorge. Students use their model to explain that the delta at Lake Saint Clair formed because of moving water.
- The materials provide multiple opportunities to show mastery of grade-level appropriate SEPs. The modules tend to follow and increase in the difficulty of SEPs as the lessons progress. In the final lessons of each module, students have more investigations with less teacher guidance throughout before completing an Engineering Challenge. For example, materials include opportunities for students to design and conduct grade-appropriate experiments. For example, in Module 1, Lessons 17–22, students complete an engineering design challenge to develop solutions to conserve water used for agriculture. Students design and test a sustainable irrigation system.
- The materials outline how the students use SEPs to investigate grade-level appropriate content concepts with opportunities to repeat the practices throughout the year. For example, each module contains a specific SEP scope and sequence with Science or Engineering Challenges. The challenge includes a set of lessons in which students apply their conceptual knowledge to solve a real-world problem through investigation or engineering design. The materials outline how the students use SEPs to investigate grade-level appropriate content concepts with opportunities to repeat the practices throughout the year.

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

- The materials identify overarching concepts using recurring themes and show how they connect within the materials. They also provide multiple opportunities for students to use recurring themes in making connections between and within overarching concepts. Materials include Module Concept Statements that are a springboard for discussion about RTCs. For example, Module 1 utilizes the recurring theme of identifying the cause-and-effect relationships to explain the phenomenon features of the Chihuahuan Desert. In Module 3, students make connections between two concept statements: 1)Energy is why things happen. Energy can transfer between objects through collisions and from place to place through water waves, electric currents, sound, thermal energy, and light. and 2)Energy transformation occurs when one phenomenon indicating the presence of energy changes into any other energy phenomenon. These statements connect to the recurring themes: patterns, cause and effect, systems, energy, and matter in Modules 1 and 3.
- The scope and sequence includes specific information about when recurring themes are introduced and when they are spiraled back into the program. The Implementation Guide contains a chart indicating that Module 1 maintains the Earth and Space Science focus in grades 3, 4, and 5. In third-grade students, the anchoring phenomenon is the transformation of Surtsey. In fourth grade, students use the Grand Canyon features and patterns to anchor their learning. In fifth grade, students investigate the landscape of the Chihuahuan Desert. Patterns and Cause/Effect relationships occur in all grade levels K-5. The Pacing Guide contains a table that shows how overarching concepts are included in Level 5, Module 1 through Level 5, Module 3.

Great Minds PhD Science Grade 5

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

- The materials strategically (long-term goals) develop students' content knowledge and skills appropriate for the concept and grade level as outlined in the TEKS. The materials include an overview document that explains how the program is structured and builds on student knowledge across grade levels, modules, and lessons by tapping into students' curiosity about the world. The program presents content and concepts for students to make connections across units throughout the program.
- The materials are systematically designed to develop and build student skills and content knowledge using phenomena appropriate to the grade level as outlined in the TEKS. The Implementation Guide demonstrates the progression of TEKS in order of the progression of skills for grades 3–5, including a side-by-side comparison of concept lessons and phenomena. For example, Module 1 contains a module map that outlines the anchoring phenomenon and three key concepts of the module. Each concept outlines the phenomenon, student learning outcome in the lessons, and content standards/SEPs/RTC/ELPS. The student learning provides a lesson progression to show how each lesson builds upon the prior lesson and links back to the anchoring phenomenon. The Module Map provides the application of concepts for the End-of-Module seminar, assessment, and debrief. For example, materials utilize a content learning cycle with five stages: wonder, organize, reveal, distill, and know.
- The materials support teachers in developing student content concepts and skills by providing resources and cues at varying points in lessons and units throughout the grade level. Materials contain a Teacher's Edition, Introduction, Background Knowledge, Prepare, and Teacher Notes that explain, describe, and make connections between the SEPs and the development of conceptual understanding. Content supports are provided to teachers through the Building Content Knowledge breakdown in the Teacher Guide. Each lesson contains support through ELD tips. Teacher notes that explain how students use the materials and content area connections for reading, math, social studies, and art.

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.

- The materials include opportunities for students to ask questions and plan and conduct investigations. Materials provide regular opportunities for students to raise questions about phenomena. In a Module 3 lesson, students look at the two models they drew of celestial objects: one from the Earth perspective and one from the space perspective. Students write questions that arise as they compare the two models and consider how the components of the system interact. Students write their questions on a sticky note or sheet of paper and use the Snowball routine to share their questions. Materials direct teachers to build the driving question board as students share, grouping similar questions. Teachers ask students to explain how the question they share relates to a previous question. Teachers make suggestions to help students group their questions.
- The materials include sufficient opportunities for students to engage in problem-solving to make connections across disciplines and develop an understanding of science concepts. For example, in Module 1, Lesson 4, students make a reading and language arts connection by reading an adapted text to find out what clouds are made of and how they are formed. Students use the text to summarize the process of cloud formation. Students use evidence from the text to

describe what they think the process of cloud formation looks like. In Lesson 7, students make a connection to math by comparing the fraction sizes of the holes in their cups.

- The materials provide repeated opportunities for students to use grade-level appropriate SEPs across various contexts throughout the course. Students complete design challenges and plan and carry out investigations within each module. The lesson model involves constant questioning, analyzing, and designing throughout the modules. Students are led through each process, learning to act as engineers and scientists as they find solutions and explain their evidence. For example, lessons are grouped by focus questions in each module. At the start of each lesson group, a table shows the scientific engineering practices and the lessons they support. In Module 1, students complete an engineering design challenge to design and test a sustainable irrigation system. The challenge requires students to use what they have learned from the previous lessons and apply them.

Great Minds PhD Science Grade 5

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). Materials drive knowledge-building for students, and phenomena are the center of each module and lesson. The materials draw students back to the phenomena through anchor models and driving board questions. Throughout every lesson and activity, the focus is on understanding the phenomena driving the instruction. For example, Module 1 has a central anchor phenomenon, the Chihuahuan Desert. Students build content knowledge to answer the essential question, "What can the landscape of the Chihuahuan Desert reveal about changes to Earth's surface?" Each grouping of lessons has a focus question that builds content knowledge for students to answer the essential question. Throughout the lessons, students refer back to the anchor question and phenomenon.
- The materials embed thought-provoking phenomena and engineering problems that require nuanced and appropriate grade-level explanations. Materials provide opportunities for students to develop, evaluate, and revise their thinking as they figure out phenomena and define/solve problems. For example, in Module 1, Lessons 3–6, students explore the water cycle as they investigate the Phenomenon Question, "Why does less precipitation fall in the Chihuahuan

Desert than in surrounding areas?" In Lessons 3 and 4, students develop models at different scales to represent the water cycle. First, students develop a model to show how the interaction between the Sun and the ocean results in the evaporation of ocean water and the release of precipitation along the coast of Mexico. Next, students develop a model to show how the condensation of water particles in the air produces water droplets that form clouds. In Lesson 5, students examine satellite videos and images of cloud movement and water vapor on regional and global scales to determine the effect of mountains on precipitation. In Lesson 6, students apply their knowledge of how water moves to the Chihuahuan Desert, and they update the anchor evidence organizer. Finally, students complete a Conceptual Checkpoint to demonstrate their understanding of how the water cycle creates weather patterns in the Great Lakes region.

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

- The materials provide opportunities to leverage students' prior knowledge and experiences related to phenomena and engineering problems, ensuring that connections are made to previous science TEKS while allowing students to communicate their experiences outside of school. For example, each module is broken into lesson sets that build to support student content knowledge. In Module 1, lessons start with introducing students to the natural and human-made features of the Chihuahuan Desert, then investigate how water and glaciers gradually move rocks, soil, and sediments on Earth's surface to create landforms, and then investigate the natural processes that lead to the formation of sedimentary rocks. These lessons build for the essential question, "What can the landscape of the Chihuahuan Desert reveal about changes to Earth's surface?" In Lesson 15 in Module 1, materials provide teachers with guidance on activating students' prior knowledge when using models to explain the formation of fossil fuels. Students look at an image of a coal mine. In Level 4, students learn that fossil fuels are nonrenewable sources of energy found underground. In this lesson, students summarize that coal is found beneath layers of sedimentary rock. Teachers encourage students to reflect on their Level 4 knowledge. Students then build on their understanding by exploring the phenomenon question, "How are fossil fuels related to sedimentary rocks?"
- The materials allow for some different entry points to the learning phenomena and/or solving problems. In grade 5 Module 3, Lesson 24, for example, teachers highlight student responses that indicate the arrangement of stars around the Sun, Earth, and the Moon. Teachers then ask students to imagine looking up at the night sky and hold a star map up high and remind students that stars are not actually on a flat, two-dimensional plane such as a wall in the classroom. In Lesson 15, students observe the photograph of the Moon during daytime or, if possible, outside to observe the Moon. Students make a comparison with a previously created Moon model.
- The materials guide teachers and students to address potential areas of misunderstanding adequately. For example, grades 3–5 materials provide a teacher guidance section at the beginning of each unit, such as an "Introduction" and "Building Content Knowledge" sections to help teachers gauge where some students may have inaccurate or inadequate prior knowledge. This section also informs teachers of the necessary prerequisite content and skills students will need to be successful in the unit. Such teacher guidance materials prepare teachers to provide accurate explanations of scientific content and concepts, as well as respond to students who may have gaps or misconceptions in their prior knowledge.

Great Minds PhD Science Grade 5

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

- The materials clearly outline the scientific concepts and learning goals behind each phenomenon and engineering problem corresponding to content concepts across the grade level. The materials provide an Anchor Phenomenon with a corresponding Essential Question for each module. For example, Module 1 has the Anchor Phenomenon of "Landscape of the Chihuahuan Desert" and the Essential Question, "What can the landscape of the Chihuahuan Desert reveal about changes to Earth's surface?" For example, Module 2 has the Anchor Phenomenon "Life Around a Mangrove Tree" and the Essential Question, "How can trees support so much life?" Module 3 has the Anchor Phenomenon "Views from Earth and Space" and the Essential Question, "How can we explain our observations of the Sun, Moon, and stars from Earth?" The materials break down each module into three concepts made of lessons that have their own focus questions and provide an answer for the teacher. Materials also provide the goal of answering the Essential Question through the Applications of Concepts, which includes an Engineering Challenge where students apply what they have learned as guided by the Anchor Phenomenon.
- The materials clearly outline the student learning goal(s) behind each phenomenon or engineering problem. For example, in grades 3–5, materials provide a "Building Content Knowledge" section that outlines overarching learning goals for each phenomenon or engineering problem addressed. Materials give a causal explanation of the phenomena or engineering problem. The explanation unpacks the meaning of the scientific idea so teachers can understand how to help students reconstruct the idea. The section also includes a breakdown of each Concept or Engineering Challenge. The Module Map lists the Anchor phenomena, concepts, and student learning or (goals) for each lesson. For example, in grade 5, a lesson on the sun's apparent motion from east to west across the sky can be used to tell time at different locations on Earth. Materials clearly outline the following lesson goals: "Students will: 1) Model how humans can use the apparent position of the Sun to tell time. 2) Model how sundials track time around the world. 3) Prepare to share models to explain how the Earth–Sun system affects time around the world. 4) Present models of how the Earth–Sun system affects time around the world."

Great Minds PhD Science Grade 5

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.

- The materials connect new learning to previous and future learning within and across grade levels. The Implementation Guide provides Horizontal and Vertical Alignments tables for teachers to see how the TEKS, SEPs, and RTCs are structured horizontally and vertically throughout the materials. For example, Level 5, Module 1, Earth Processes, includes the horizontally aligned content strands: Matter and its Properties and Earth & Space (10 and 11). Module 1 includes most Science and Engineering Practices TEKS. The alignment document for Module 1 includes Recurring Themes and Concepts patterns, cause/effect, scale, proportion, and quantity, systems, energy and matter, and stability/change. Materials display vertical alignment of standards in the same chart.
- In Module 3, students review prior knowledge of Earth's solar system from Level 3. Students identify the planets in the diagram based on their positions in relation to the Sun (3.9B). In grade 4, students identified moon patterns and the relationship between the Earth, Moon, and the Sun. Students can apply this knowledge to the planet's relative location to the Sun. If needed, teachers will help students identify planets accurately by asking guiding questions such as the following: "Where do you see the Sun?" "Where is Earth?" "Which planets are closest to Earth?" and "Which planets are farthest from the Sun?" If needed, provide a list of planet names for students to use. In Lesson 2, the materials have students use the terms *balanced* and

unbalanced forces instead of *equal* and *unequal forces* to better prepare students for learning in subsequent grade levels.

- The materials present content in a way that builds in complexity within and across units and grade levels. The Teacher's Guide provides a Spotlight on Knowledge and Skills throughout lessons to explain how a lesson activity develops students' understanding of content, concepts, and practices throughout the year and across grade levels. For example, Module 1 in third grade covers Earth Changes, where students learn that weathering is the breaking down of rock. Module 1 in fourth grade covers Earth Features, and students learn that weathering includes forces. Module 1 in fifth grade covers Earth Processes, where students learn that the force of weathering, erosion, and deposition create landforms.
- Materials include sidebar notes for teachers that explain how students build content knowledge. For example, in Level 5, Module 2, Lesson 12, the sidebar note, Spotlight on Knowledge and Skills, describes the vertical progression of students' knowledge related to instinctual and learned behaviors. Materials state, "This lesson builds on students' prior knowledge that the relationship and interactions between parents and offspring result in the acquisition of traits and behaviors (4.13B, 1A)." A second Spotlight on Knowledge and Skills in the same lesson further explains that Lesson 12 has students revisit inherited and acquired traits from 4th grade so that they can explain how those behaviors can be instinctual or learned, and how those behaviors can help organisms survive their environment. In Lesson 14, a sidebar note describes the vertical progression of students' knowledge related to ecosystems. Materials state that students learn about mushrooms as they describe the mushroom's role in cycling matter through the Big Thicket ecosystem (4.12B). In this lesson, students "learn how decomposers interact with and recycled matter within an ecosystem (5.12A, 5.12B)."
- In Module 3, Sun, Earth, and Moon Systems, Lesson 1 contains a Spotlight on Knowledge and skills that explains how students build on their understanding of (4.9B), where students used patterns to predict the observable appearance of the Moon from Earth to understand (5.9) and how the Sun appears to move across the sky.

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

- The materials include a progression of concrete and then representational before abstract reasoning when presenting concepts that allow for increasingly deeper conceptual understanding. Lessons move through a learning cycle starting with observing a phenomenon and generating questions. Students develop an original explanation and create questions. Then students explore the question through investigation, which allows for a concrete experience. Students move to a representational understanding when they then apply evidence and reasoning to revise the explanation of the phenomenon. Students utilize abstract reasoning when they then apply knowledge to explain a different phenomenon.
- In Module 1, students begin with the phenomenon of the Chihuahuan Desert Landscape by observing a map and wondering how it has changed over time. Later in the Module, students create a model to demonstrate how the Rio Grande affects the land of the Chihuahuan Desert. The End of Module Assessment concludes with a Socratic seminar. Students discuss the essential question, "What can the landscape of the Chihuahuan Desert reveal about changes to Earth's surface?" They use the products from the module as evidence for their explanation.
- In Module 2, Ecosystems, Lesson 3, students make an initial claim about what they think plants need to grow based on prior learning. In Lesson 5, students conduct an investigation where they observe and measure plants with different amounts of soil and water to build an anchor chart,

stating that “Living plant matter is formed with matter from air and water.” The teacher asks students to revisit the initial claim of plant needs from Lesson 3. In Lesson 22, after students observe plants grown in sunlight and plants grown without sunlight, evidence of how students’ understanding of life's matter has deepened throughout Module 3 is shown in this final anchor chart update; “Add the heading Life’s Energy to the anchor chart and use student responses to summarize new knowledge.”

- In Module 3, throughout Concept 1, students explore patterns of the Sun and why shadows change with the position of the Sun. Students then conduct an experimental investigation to determine how the position of light affects the length of a shadow and use a compass to identify the apparent east-to-west motion of the Sun across the sky. Students develop an initial model of the way the Sun appears from Earth throughout the day and use a space-view model to explain daytime and nighttime and to support claims.
- The materials sequence instruction in a way that activates or builds prior knowledge before explicit teaching occurs, which allows for increasingly deeper conceptual understanding. Materials provide a Building Content Knowledge section of the Module Overview which explains how students build their understanding of Earth with increasing depth throughout Module 1. For example, the Building Content Knowledge section shows that Concept 1 begins with activating prior knowledge of the water cycle as learned in grade 4. In Concept 1, students begin Lesson 3 by examining an image of The Chihuahua Desert and discussing how precipitation changes the look of the land that they learned in Level 4 (4.10A). Students then create a physical model where they label each component of the water cycle, including the lamp representing the sun, to help students explore the role of the sun in the water cycle to address (5.10C). In Lesson 5 they can explain their new understanding of how the sun and ocean interact in the water cycle when students create their anchor chart. The anchor chart is foundational learning that students develop together throughout an entire module. The progression of updates to the anchor chart illustrates the increasing depth of students’ understanding of science concepts throughout the module.

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

- The materials clearly present grade-specific core concepts, recurring themes and concepts, and science and engineering practices. Materials use the 7E (Elicit/Engage, Explore, Explain, Elaborate/Extend, Evaluate) instructional model for sequencing science instruction. The Engage/Elicit Phase captures students’ interest in learning through activities such as teachers asking open ending questions activating learning and identifying problems. Materials separate Explore phases into an Organize and a Reveal section. In Organize, students represent the natural world by using models, constructing explanations, and proposing solutions. In Reveal, students plan and conduct investigations. During Explain, students represent the natural world using models, construct and evaluate explanations, propose solutions, and communicate the results. In Elaborate/Extend, students ask questions and identify problems, construct and evaluate explanations and propose solutions communicating results. In Evaluate, students reflect on their new science concepts and students evaluate the accuracy of student ideas and what they have learned.
- The materials accurately present core concepts, recurring themes and concepts, and science and engineering practices (SEPs). Across lessons, units, and grade levels, materials are free from scientific inaccuracies. Materials present scientific content that is current and reflects the most current and widely accepted explanations. In Module 1, Lesson 1, the materials provide accurate

information about the Chihuahuan Desert. They provide how it shares its name with the Mexican state of Chihuahua. “The word chihuahua is thought to originate from the Nahuatl word *xicuahua*, meaning ‘dry, sandy place.’ Indigenous groups have inhabited the Chihuahuan Desert for thousands of years. They have used its resources for food, shelter, medicine, and other cultural traditions, and they continue to do so today.”

- In Lesson 3 of Module 1, materials provide accurate information concerning the difference between steam and water vapor. Water vapor is invisible and that steam is a mixture of water vapor and water droplets. In Module 3, Lesson 4, materials provide accurate information in the Teacher Note that the term mass describes the amount of matter in an object, and weight describes the force acting on an object due to gravity. Students are discussing the mass of objects in the lesson and not weight. In Module 2, Lesson 6, materials accurately explain that students learn about photosynthesis only in plants at this level; algae and cyanobacteria also produce food through photosynthesis. All photosynthetic organisms are producers. Students will refine their definition of photosynthesis to include energy from sunlight.

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

- The materials include specific learning targets for each grade level. For example, materials provide a scope and sequence document that outlines when learning targets are introduced, developed, and mastered within the program. Each module includes a module map to highlight specific skills addressed in each lesson. Learning targets are highlighted to support teacher facilitation.
- The materials clearly define the boundaries of content that students must master for the grade level. Materials that identify the objectives used are all TEKS from grade 5. The materials provide unit objectives for each unit and student learning objectives for each lesson. In Module 2, Lesson 6, materials explain in the lesson that the term *respiration* refers to cellular respiration, and is not the same as breathing (inhaling and exhaling gasses). Students will learn about cells in middle school. Module 3, Lesson 2 materials explain that “force is measured in units called newtons (N). One newton (1 N) is equal to the force necessary to accelerate 1 kg of mass by 1 m/s each second.” It explains that at level 5, students do not need to understand this information. Materials instruct teachers to only instruct students that “a force can be measured in units called newtons.”

Great Minds PhD Science Grade 5

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 the 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 grade-level misconceptions, to support the teacher's subject knowledge and recognition of barriers to student conceptual development as outlined in the TEKS. Materials explain the intent and purpose of the instructional design of the program.

Evidence includes but is not limited to:

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

- The materials include guiding documents that support teachers in understanding how new learning connects to previous and future learning across grade levels. The materials contain a scope and sequence that showcases which skills and standards students should have mastered in previous grades and how learning will progress in the subsequent grades. Materials provide a Horizontal and Vertical Alignment chart separated by content standards, Scientific and Engineering Practices, and Recurring Themes and Concepts. A TEKS Content Development Progression chart also provides a vertical progression for teachers. Spotlight on Knowledge and Skills sidebar notes describe how students' content knowledge and skills are developed as they relate module concepts to prior learning, and build and connect their new knowledge and skills in future modules or grade levels. In Module 1, Lesson 1, materials provide a Spotlight on Knowledge and Skills sidebar explaining how in Level 4, students learn about slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice. In Level 5, students will build on that knowledge to model and describe how these processes result in the formation of various landforms.
- The materials include guiding documents that explain how content and concepts increase in depth and complexity across lessons and units within the grade level. A TEKS Content

Development Progression chart also provides a vertical progression for teachers. Each module lists out the objectives being addressed and places in bold the parts of the content or entire contents that will be mastered in the module. For example, 4.6A is included in Module 1 to review previously learned objectives where students describe matter using observable physical properties, but 5.6A of comparing and contrasting matter is mastered in the Spotlight Lessons on Physical Properties of Matter after Module 1.

- The Teacher Edition of the Modules includes Spotlight on Knowledge and Skills in the sidebars of the lessons explaining how the materials increase in complexity across the grade level. The vertical alignment of knowledge related to the physical properties of matter is described in the Spotlight Lessons on Physical Properties of Matter. In Lesson 1, a Spotlight on Knowledge and Skills note explains the physical properties students learned in Levels 3 & 4. Now, students will review and expand their understanding of these properties (excluding temperature). Module 3, Sun, Earth, and Moon, Lesson 1, includes a vertical and horizontal alignment in the Spotlight on Knowledge and Skills sidebar note. “In this lesson, students build on their understanding of how patterns can be analyzed to predict the observable appearance of the Moon from Earth (4.9B). As students progress through the module, they will apply this understanding to how the Sun appears to move across the sky when viewed from the Earth (5.9).“

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.

- The materials include background information for teachers that provides explanations and examples of science concepts. Modules provide explanations of concepts for teachers in the Additional Reading For Teachers. Each module provides a list of other resources that can support the teacher’s understanding such as websites and books being listed. The Additional Reading for Teachers section of the Module 1 Overview lists three web resources to support teachers’ pedagogical and subject knowledge. The web resources are as follows: National Park Service “Chihuahuan Desert Ecoregion: Climate and Topology” web page, National Park Service “Geology of Big Bend” web page, and National Park Service “The Rio Grande” web page.
- The materials identify common grade-level misconceptions students may have about the science concepts. The Addressing Misconceptions section of the Implementation Guide describes how the curriculum guides teachers in addressing misconceptions. Module 1, Earth Processes, lists three common misconceptions. Next to the misconceptions in the chart are developed understandings. One common misconception is that all clouds produce precipitation. The developed understanding states a certain amount of water must condense in a cloud before the cloud produces precipitation.
- The materials contain embedded instructional supports and sidebar notes with additional information for teachers that address misconceptions. In Module 1, Lesson 1, a Check for Understanding box provides the learning goal of the lesson, TEKS assessed, evidence students will produce, and next steps. The next steps include misconceptions and provide a suggestion for support to revisit the “Earthshake” poem, illustration, and endnote, to review how processes change natural features over time. For example, in Level 5, Module 3, students make a prediction and decide if the prediction is based on speculation or reasoned judgment. Embedded supports provide teachers with a Spotlight on Knowledge and Skills to support students engaging in argument. The materials help the teachers to understand that arguing from evidence requires students to differentiate between fact, reasoned judgment, and speculation in an explanation. Students need support distinguishing between reasoned

judgment and speculation. Teachers need to clarify that reasoned judgment is supported by evidence, while speculation is not supported by evidence.

- The materials include supports for teachers to develop their own understanding of more advanced, grade-level concepts. Teacher Notes in the Teacher Edition contain information that supports teachers' understanding of more advanced grade-level concepts. Module 1, Lesson 5, states, “There are four types of deserts: subtropical, coastal, interior, and rain shadow. Rain shadow deserts, such as the Chihuahuan Desert, are created when mountain ranges block moist air moving from oceans.” In Module 2, Lesson 21, a Teacher Note is provided to address how seeds have energy to grow when they are planted without needing sunlight at the beginning of life.

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

- The materials provide a purpose or rationale for the instructional design of the program. In the Implementation Guide within the section Foundations, the materials provide a rationale designed to build knowledge coherently and engagingly. The materials offer students “deep conceptual knowledge and rigorous problem-solving experiences as they engage with new science content.” This “helps students apply knowledge to new situations and to see connections.” The Knowledge section of the Implementation Guide outlines how knowledge builds in the materials. In each module, students participate in investigations, discussions, and activities that build enduring scientific understanding and competence. “Across modules and levels, students revisit fundamental science concepts, developing a deeper understanding of those concepts and applying them to make sense of new phenomena.”
- The materials provide a framework explaining the main intent or goals of the program. Materials provide a Teacher’s Guide that thoroughly describes the program's instructional approaches and references the research-based strategies present in each unit. Specific supports for each unit can be found in the Unit Overview for each unit. The Implementation Guide explains its foundation. “The mission of PhD Science Texas is to help teachers provide their students with a science education that is as limitless as science itself. To achieve this goal, students rigorously engage in learning that builds their coherent understanding of scientific knowledge.” In each module, students participate in investigations, discussions, and activities that build enduring scientific understanding and competence.
- Each module contains a storyline such as the Chihuahuan Desert for Level 5, Module 1. Students actively engage in a learning cycle of asking questions and sharing initial ideas about phenomena, investigating those questions, developing evidence-based explanations, and applying their knowledge to explain different phenomena in new contexts.

Great Minds PhD Science Grade 5

Indicator 4.1

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

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

- The materials identify specific sensemaking behaviors of students. For example, materials identify sensemaking behaviors in the Introduction of the Implementation Guide. "Materials allow students to discover and understand the world in which they live, to solve problems, and to apply knowledge in different contexts. The PhD Science® Texas curriculum is designed to build knowledge in a coherent and engaging way. Students gain deep conceptual knowledge and rigorous problem-solving experiences as they engage with new science content. The curriculum's coherence helps students apply knowledge to new situations and to see connections among different contexts." Materials in the Implementation Guide provide a table titled Research Says, Students Need, and PhD Science Responds. These two quotes come from the column titled PhD Science Responds: "Students are given opportunities to develop and drive investigations and to apply scientific processes in new contexts through Science Challenges or Engineering Challenges," and "Connections with other content areas in lessons signal

opportunities for students to practice grade-appropriate English language arts skills, mathematics skills, and skills from other content areas."

- The materials consistently provide learning activities that support students' meaningful sensemaking. For example, students study the Chihuahuan Desert to learn about changes to Earth's surface in Module 1. Students create models of the water cycle and explain how the water cycle creates precipitation. Students use what they have learned in previous lessons to design a solution that can conserve water by designing an irrigation system. Students build prototypes and share their designs with their peers.
- Module 3, Lesson 24 materials have students observe the current star map of the local sky. Teachers explain to students that a star map shows the stars that are visible in the night sky from a specific location on Earth at a specific time. The teacher revisits the phenomenon question, "How does the night sky change throughout a year?" Students discuss how to investigate changes over time and highlight responses about using a star map. Students analyze star maps from different times of the year and create a class data table to show similarities and differences at different points in the year. Students use this knowledge to develop a model to explain the positions of stars at different times of the year.

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

- The materials provide opportunities for students to engage in purposeful and targeted activities with grade-level appropriate scientific texts. For example, in Module 2, Lesson 1, students gather evidence about ecosystems through the analysis of the adapted text, *The Mangrove Tree,* by Roth and Trumbore. The teacher guides the students through a discussion of the importance of the tree to the community. Students draw, label, and record information about the organisms mentioned in the read-aloud.
- In Module 3, Lesson 21, the materials challenge students to draw a model to demonstrate how distance affects the apparent brightness of stars in space. Students make models, share their ray diagrams, and agree on a model that shows a star emitting light rays in straight lines. At the end of the lesson, students read *Look Up! Henrietta Leavitt, Pioneering Woman Astronomer*. Materials direct teachers to ask questions and connect to previous learning.
- Students engage with scientific texts, including activities such as pre-reading and vocabulary, to help them develop an understanding of concepts. For example, students learn vocabulary through investigations, models, explanations, and class discussions. The Implementation Guide provides terminology routines such as Act It Out, Concept Maps, Frayer Model, images, link up, morpheme matrix, and signal unknown words. For example, Teacher Notes in the sidebar of the lesson offer tips for prereading and terminology support. In Module 1, Lesson 1, a Teacher's Note is provided to point out the front and back cover of the book before reading the poem to help students gain ideas about the content.
- In Module 2, Lesson 1, students use organism cards to gather evidence about organism interactions and engage with other students about their findings.
- In Module 3, Sun, Earth, and Moon System, Lesson 1, the teacher reads aloud from *Polynesia's Genius Navigators* as students follow along. After the reading, students work in pairs to complete the Boxes and Bullets text-based routine. This routine guides students in finding the main idea and details. Students record their responses in their Science Logbook.
- The materials provide multiple opportunities for students to engage with scientific texts to gather evidence and develop an understanding of concepts. For example, students read a poem in Module 1, Lesson 1, to compare how features were formed on the Washington coast

compared to the Anchor Phenomenon of the Chihuahuan Desert. In Lesson 4, students read about clouds to find out how clouds are made, and in Lesson 9, students read another poem to compare the descriptive words in the poem to the glacier model they observed.
- In Module 3, Lesson 6, students gather evidence about how to accurately model the Sun's movement by reading an article about a scientist's observations of Jupiter. The teacher displays the diagram of Earth's solar system and wonders aloud about Jupiter's position relative to Earth. Students complete a 3–2–1 Response routine in their Science Logbook to reflect on the text.

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

- The materials provide opportunities for students to communicate thinking on scientific concepts in written and graphic modes. For example, in Module 1, Lesson 5, students complete a notice and wonder chart about the movement of the clouds from a video they watched.
- In Module 1, Lesson 3, students draw a precipitation model in their logbook. Students discuss with partners what causes different types of precipitation. After the model is drawn, students observe an actual model of an ocean water cycle. Students record a picture of this model in their Logbooks for discussion. Materials include a science logbook that includes activity guides for students to develop models, record observations, make predictions, record and analyze data, and write their claims.
- For example, in Module 2, Lesson 5, students use their logbook to develop an understanding of plant matter sources through a chart that prompts students to make a claim. Students complete a chart to support the claim with evidence and reasoning.
- In Module 3, Lesson 5, students observe the location of the school building's current shadow at several times of day. Students draw diagrams in their Science Logbook showing how the shadow of the building changed from the early morning. Students then add the Sun's location during the two different times of the day.

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

- The materials provide authentic student engagement and perseverance of concepts through productive struggle while acting as scientists and engineers. In Module 1, Lessons 1-2, students develop models that represent their initial ideas about the processes that have changed the features of the Chihuahuan Desert and then share ideas with other students. Students compare their models with their peers. In Lessons 7-9, students use stream tables to determine how rivers form canyons in a desert and observe glacial erosion through a model to compare glacial valleys and river valleys. In Module 2, Lesson 5, students analyze the results of the investigation to help determine where plants get the matter they need for growth. Later, in Lesson 25, students engage in an engineering challenge to find a solution to reducing the impact of an invasive species on an ecosystem. In Module 3, Spotlight Lessons on Force, Motion, and Energy, Lesson 4, students investigate how changing the mass of a light rail train can affect the speed of the train system.
- The materials support students as "practitioners" while they are figuring out (sensemaking) and productively struggling. For example, in Module 3, Lesson 8, Spotlight Lessons on Forces, Motion, and Energy, students construct basic circuits in the Buzzer, Motor, and Light Bulb

stations. Students make one change at a time to the circuits and observe the effects of that change. Students record their observations of the circuit components in their Science Logbook. In Module 3, Lesson 7, students look at materials to create a space-view model. Students think about how to make a model of the Earth–Sun system from the space perspective. In small groups, students develop a model explaining what a day is. Later, in Lesson 23, students develop an explanation of how Polaris does not appear to move east to west as other stars do. Students use the Earth-view model in their groups, and the teacher leads a discussion about their observations. Students draw a model from the space perspective in their Science Logbook to show why Polaris is always visible in the northern sky.

- The materials create *transfer* opportunities for students to take what they have learned and use it flexibly in new situations. In Module 3, Lesson 22, materials direct students' attention to the anchor chart and ask them to consider how they could use their Earth-view student models to explain the apparent motion of Sirius in the time-lapse video. Materials remind students to "consider knowledge from previous lessons" as important when investigating the apparent motion of stars. The class discusses how the Earth-view student model could be modified to gather information about the Phenomenon Question.

Great Minds PhD Science Grade 5

Indicator 5.1

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

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

- The materials provide opportunities for students to develop how to use evidence to support their claims. In Module 1, Lesson 2, students develop an initial anchor evidence organizer to begin describing the processes that formed various natural features of the Chihuahuan Desert. The teacher's sidebar note states "Throughout this module, students develop an anchor evidence organizer. An evidence organizer is used instead of an anchor model because it allows students to more easily visualize their thinking about the relationships between natural features and geologic processes."
- In Module 2, Lesson 23, students gather evidence about claims through the practice of developing and using scientific models. Students create a model and use the evidence to describe the health of the mangrove tree ecosystem. Materials direct teachers to "Agree that several different factors could remove aquatic plants from the ecosystem. Explain that groups will use their yarn webs to represent the effects of removing aquatic plants. Identify the organisms that eat aquatic plants, and tell students representing those organisms to drop their yarn. Then identify organisms that eat consumers of aquatic plants, and tell students representing those organisms to drop their yarn as well. Continue until all relevant organisms in

the ecosystem have been affected. Reflect with students on the drastic change in the amount of food available to those organisms."

- In Module 3, Lesson 7, teachers display the materials for the space-view model. Students consider how to make a model of the Earth-Sun system from the space perspective. Teachers challenge students to develop a model that explains what a day is. As students work, they notice that they need to mark a particular location on Earth to help them keep track of Earth's rotation. Students use their observations of daytime and nighttime from the space perspective to make a claim about another location on Earth. Students are introduced to a city on the opposite side of the Earth from their current location that will experience nighttime during the lesson. Teachers help students find the selected city on their mini Earth models and instruct students to write a claim about whether it is daytime or nighttime in this city and to explain their reasoning in their Science Logbook. After several students have shared their claims and reasoning, the teacher shows students the live camera feed from the selected city to confirm that it is nighttime on the opposite side of Earth. Students indicate whether their predictions were correct by using a nonverbal signal.
- The materials specifically prompt students to use evidence when supporting their claims. In Module 1, Lesson 6, students explain how the water cycle and natural features create precipitation. In the Launch, teacher instructions state to ask "students whether they see evidence of other natural features that could affect precipitation and cause a rain shadow in the Chihuahuan Desert." Students collect evidence for the class anchor chart. Students discuss which evidence should be included in the organizer. Students participate in a Socratic Seminar where they prepare for and participate in a collaborative, evidence-based, academic conversation in Lesson 23. The teacher instructions include, " In the Socratic Seminar, encourage students to respond to one another directly, with minimal teacher facilitation. Students can remind one another of conversation norms, ask for evidence, and pose questions to extend the conversation."
- In Module 2, Lesson 5, students use evidence about plant matter sources to make a claim, support the claim with evidence, and provide reasoning for their claim about plant matter sources. In Level 5, Module 2, Lesson 18, students confirm that animals get energy from the food they eat. Teachers ask students to reflect on the relationship between food and energy and have students respond to the question in their Science Logbook (Lesson 18 Activity Guide). Materials tell students to use evidence from the mouse investigation to support their predictions with the class.

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

- The materials include opportunities to develop and use vocabulary *after* having a concrete or firsthand experience to which they can contextualize new terms. In Module 1, Lesson 13, students study sedimentary rocks. Students make a dough rock model in this lesson and draw a diagram of their model. After having the hands-on activity of pressing and squeezing the dough, the teacher explicitly teaches the students that the pressing that they did to the dough is called *compaction*. Students label compaction in their drawings.
- In Module 3, Lesson 3, students investigate light with a lantern and their Science Logbook. The teacher then poses some questions to the class and explains the meaning of *emitting* and *light source*. The students develop a class light model and label the model using the vocabulary they experienced in the lesson.
- The materials present scientific vocabulary using multiple representations. In Module 1, Lesson 13, students physically act out *compaction*. They then draw the process in their journals. Next,

they look at models that show *compaction* and analyze the models. Next students look at the model of sedimentary rock formation and label compaction in the diagram.

- In Module 3, Lesson 6, students explain that scientists refer to the spinning motion around a point or *axis* as *rotation*. Earth rotates around an imaginary line called its *axis*. Teachers display the image of Earth with its axis labeled. When discussing the direction of rotation, students use the terms clockwise and counterclockwise. Teachers display for students the drawings of clockwise and counterclockwise directions and demonstrate the difference.
- The materials provide opportunities for students to apply scientific vocabulary within context. As students learn the terms *compaction* and *cementation*, they apply the terms to each step of their learning. They act the process out when they make dough conglomerates. They then look at models that show compaction and cementation. Students label diagrams and include a description of compaction and cementation. In Module 1, Lesson 13, students make an initial model to show how sedimentary rocks form from the compaction and cementation of sediment. Then students observe diagrams and a model to explain that compaction occurs when layers of sediment are deeply buried and placed under pressure by the weight of overlying layers. In Lesson 14, students explore how particles that are too small to be seen contribute to the process of cementation. Then students synthesize their knowledge of *erosion, deposition, compaction*, and *cementation* by revising their initial model to represent these processes and answer the Phenomenon Question: "How do rocks form from sediment?"
- In Module 3, Lesson 6, students work in small groups to develop a model to represent their understanding of the Earth-Sun system from the perspective of Earth. Students read about Galileo and revisit their Earth-View Student model. The teacher and class engage in a discussion about their model and discuss the terms *rotation* and *axis*. In Module 3, Lesson 12, students use evidence from photographs to explain that passing from one medium into another medium causes a light ray to bend. After students finish writing, materials invite them to share their responses with the class. The teacher explains that students observed *refraction*, which is when a light ray is bent as it passes from one medium into another.

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

- The materials provide opportunities for students to develop how to engage in the practice of argumentation and discourse. In Module 1, students engage in argumentation in lesson 2 as they determine what processes formed natural features in the Chihuahuan Desert. Students justify their agreements or disagreements with evidence from their observations.
- In Module 2, Lesson 24, students engage in the Give One-Get One-Move On Instructional routine to discuss the findings from their research. The sidebar teacher note includes the following information about the Give One-Get One-Move On routine steps, which include students recording key ideas on index cards or sticky notes, and then pairing up with a partner with whom to share their key ideas. Teachers announce "Give One" to indicate that students should share an idea and "Get One" from another student. Teachers then announce "Move On" to indicate that students should circulate again to find a new partner and repeat the process, explaining the new idea to the new partner.
- In Module 3, Spotlight Lessons on Forces, Motion, and Energy, Lesson 1, teachers display the prepared anchor model that shows the light rail train system diagram. Students share information about the forces they think to move the train. As students share, teachers ask the rest of the class to use nonverbal signals to indicate whether they agree or disagree that a suggestion correctly describes how the train starts to move. The teacher calls on students to

justify. For example, in Teacher Edition: Level 5, Module 3, Spotlight Lessons on Forces, Motion, and Energy, Lesson 15, materials provide student groups time to share their solutions and demonstrate their light rail train system prototypes during class presentations. The teacher collects feedback that groups provide to each other.

- The materials integrate argumentation and discourse within stages of the learning cycle. In Module 1, Lesson 13, students participate in a Think-Pair-Share while looking at a compaction and cementation model. Students work in pairs to answer questions about compaction and cementation. Later, in Module 1, Lesson 23, students explain how natural processes change Earth's surface and materials and can be affected by human activity in a Socratic Seminar using all the observations and evidence they have collected through the module.
- In Module 3, Lesson 26, materials provide the opportunity for a student-led conversation. The teacher presents the following Essential Question for student discussion: "How can we explain our observations of the Sun, the Moon, and stars from Earth?" Students discuss the question in the Socratic Seminar. "Students respond to each other directly, with minimal teacher facilitation. Students can remind one another of conversation norms, ask for evidence, and pose questions to extend the conversation."

Materials provide opportunities for students to construct and present developmentally appropriate written and verbal arguments that justify explanations to phenomena and/or solutions to problems using evidence acquired from learning experiences.

- The materials provide instruction for how to construct and present a verbal or written argument to problems using evidence acquired from learning experiences. For example, in Module 1, Lesson 23, students participate in a Socratic Seminar. Students record in their logbook the answer to the Module Essential Question, "What can the landscape of the Chihuahuan Desert reveal about changes to Earth's surface?" Students use provided conversation strategies to discuss the essential question and provide evidence of their thoughts. Teachers act as facilitators and have a set of questions that they can use to move the discussion along. After the seminar, students review their position and make changes based on the class discussion.
- In Module 3, Lesson 7, students investigate a space-view model; students use a mini Earth model to observe a city on the opposite side of the Earth city from where they are located. Students then write a claim about whether it is daytime or nighttime in the city and explain their reasoning in their Science Logbook.
- In Module 3, Lesson 10, teachers introduce the presentation checklist in their Science Logbook and discuss student questions about the list. Students use a presentation preparation page in their Science Logbook to organize the content needed for their presentations. Students' preparation may also include creating a new model, which will be used to support the following explanations: how a sundial keeps track of time in the daytime in their global city, how the Sun appears to move across the sky from the perspective of their global city, and how the shadows in their global city differ from shadows in their school's location. Materials direct teachers to remind students to determine how each group member will contribute to the presentation.
- The materials provide opportunities for students to justify explanations of phenomena and solutions to problems using written and verbal arguments to problems using evidence acquired from learning experiences. For example, in Module 2, Lesson 5, students use evidence to explain where plants get the matter they need for growth during a class discussion. Teachers remind students to use the data they collected from the teacher investigation to make a new claim about the Phenomenon Question: "Where do plants get the matter they need for growth?" As

they collect data from their investigations later in the module, students can consider whether the evidence supports or refutes this claim.

- The materials provide criteria for developmentally appropriate arguments to explain a phenomenon or defend a solution to problems using evidence acquired from learning experiences. For example, in Student Edition: Module 3, Sun, Earth, and Moon System, Lesson 7, materials provide a guide for students to make a claim about daytime and nighttime. The student guide includes a template for students to write and draw their thoughts about their claims and reasoning. In Teacher Edition: Module 3, Sun, Earth, and Moon System, Lesson 14, materials provide teacher guidance on how to use peer feedback and evidence to improve team designs. Student groups test other groups' designs and provide data as feedback. Groups then use evidence from data tables to determine whether their design solves the accessibility problem.
- In Lesson 14 of Level 4, Module 2, students test the group's design and provide feedback. Materials instruct the observers to record observations and feedback from the testers in the data table in their Science Logbook. As testers work, teachers guide them to provide feedback on the design. Students complete the prompts in the Test Another Group's Design and Provide Feedback section in their Science Logbook. Testers share their ideas with the observers. Groups switch tester and observer roles. Materials prompt students to repeat the modified Jigsaw routine so that the new testers move to a different group to test the design and the new observers record data for the second test. Materials allow testers time to complete the feedback form and provide design feedback to the observers.

Great Minds PhD Science Grade 5

Indicator 5.2

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

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

Meets | Score 4/4

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

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

Evidence includes but is not limited to:

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

- The materials provide teachers with possible student responses to questions and tasks. For example, in Module 1, Lesson 4, materials include questions in bold text and possible student responses in italics. Lesson 4 lists one question: "How do you think a piece of dust and a water particle compare in size?" Materials include two sample student answers below it in italics. The lesson continues with a model of States of Matter and then another question and sample answers.
- In Module 3, Lesson 24, students observe star maps and determine which constellations are visible. The materials invite them to compare their star map with a neighboring group's star map. Materials provide possible student responses to questions. For the question, "What similarities do you notice in star maps from different months?" possible responses include, "In January and February, we can see most of the same constellations. In May and October, we can see Cygnus, Lyra, and Ursa Minor."
- The materials provide teacher responses to possible students' responses, including how to build on students' thinking. For example, in Module 1, Lesson 7, students describe what happened to the water in the model that shows how a river valley forms. Materials provide a Check for Understanding box that provides expected evidence that students will provide when answering

the question. If students do not match the evidence, then a box titled Next Steps provides guidance for teachers to support student thinking. For example, if a student cannot explain how water forms a valley, then the material suggests, "invite them to observe the mountain model up close, and point out the low areas in the mountains where water collects and flows downhill."

- In Module 2, Lesson 1, there is a pre-assessment in which the teacher gauges students' prior and developing knowledge of how models can show relationships in ecosystems. The materials demonstrate what the evidence would be: "Students use arrows to model (5.1G) interactions between organisms (5.12A) in the mangrove tree ecosystem (5.5D)." If the students do not have the same evidence, the materials provide a teacher response to build the student's thinking with the use of Next Steps. The teacher then "presents students with two organism cards at a time. Ask students to revisit the information they recorded from The Mangrove Tree in their Science Logbook. Guide students to describe how the organisms interact and, if they do interact, how they could model the interaction with an arrow."
- The materials provide support for teachers to deepen student thinking through questioning. Each of the Modules includes a Socratic Seminar to demonstrate their knowledge of the concepts. For example, in Module 1, Lesson 23, students participate in a Socratic Seminar with the guiding question, "What can the landscape of the Chihuahuan Desert reveal about changes to Earth's surface?" Teacher materials provide six questions to spur additional conversation for students such as the question, "How has wind changed the Chihuahuan Desert landscape over time?"
- In Module 2, Lesson 27, students participate in a Socratic Seminar to discuss the Essential Question, "How can trees support so much life?" The teacher is provided four questions to encourage additional conversation as needed.
- In Module 3, Lesson 2, Build a Driving Question, materials instruct students to look at the two models they drew of celestial objects: one from the Earth perspective (Lesson 1 Activity Guide C) and one from the space perspective (Lesson 2 Activity Guide). Materials provide questions for teachers to ask: "How could the same objects appear differently in our two models? How can our observations from Earth inform us about the space-view model of the system?"

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

- The materials provide embedded supports for the teacher in how to introduce and scaffold students' development of scientific vocabulary. For example, in Module 1, Lesson 3, students develop models to show how the sun and oceans interact. In the lesson, students look at a map to determine the amount of precipitation in the area. A teacher sidebar note titled Spotlight on Knowledge and Skills notes that students distinguished between weather and climate in fourth grade. Teacher support suggests, "If needed, remind students that weather describes the temperature, precipitation, cloud cover, and wind conditions in a location at a particular time, whereas climate refers to the typical pattern of weather conditions in a location over a long time."
- The materials introduce vocabulary throughout the lessons. Materials provide key terms to be used throughout the Module, stating, "In this module, students learn the following terms through investigations, models, explanations, class discussions, and other experiences." For example, in Module 1, Lesson 13, students make a model to show the compaction of sediment. Then they look at diagrams and models to explain compaction. Students use the terminology to answer anchor questions such as, "How do rocks form sediment?" The teacher's directions

explicitly teach *compaction* through making a model and the directions provided state, "After students finish, invite pairs to share their rock model with the class. Build on students' ideas to summarize that in their models, students pressed the gravel into the dough and squeezed the gravel and dough together to form a rock. Inform students that the process of pressing or squeezing sediment together is called *compaction* and that the process of sediment sticking or binding together is called *cementation*. Explain that in the model, the dough acts like glue or cement to hold the sediment pieces together." A sidebar Teacher Note on the same page supports student vocabulary development by stating, "Support students' understanding of the terms *compaction* and *cementation* by relating them to familiar processes. Tell students they demonstrated the process of compaction when they pressed the dough and gravel together in their sedimentary rock formation models."

- The materials provide guidance for the teacher on how to support students' use of scientific vocabulary in context. For example, in Module 1, Lesson 23, students make a relationship map to show connections among key terms learned throughout the module. Materials provide the following directions for teachers: "Remind students that during the seminar they should incorporate science terminology learned during the module. Tell students they can refer to their relationship map from this lesson's Launch, the anchor chart, the anchor evidence organizer, and other classroom resources to support their discussion."
- In one of the terminology learning routines provided in Module 2, Lesson 27, the students make a relationship map to show connections among key terms learned throughout the module. Students draw arrows or other symbols and write words between the terms to express the relationships.

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

- The materials provide teacher supports to prepare for student discourse. The Implementation Guide provides explicit instructions on facilitating student discourse and support during a Socratic Seminar. It provides an overview of the activity and outlines student and teacher actions during the activity and outlines the teacher's effective uses of the Socratic Seminar. The teacher displays and reads the Essential Question aloud to prompt the discussion.
- For example, in Module 3, Lesson 26, students will share their understanding of the Essential Question with one another through a Socratic Seminar discussion. Students write an initial response to the Essential Question, "How can we explain our observations of the Sun, the Moon, and stars from Earth?" in their Science Logbook as a Quick Write. When students finish, they then draw a line below their responses. At the end of the seminar, students will revisit their responses to see how their thoughts have changed.
- The materials provide teacher questions for supporting student discourse and the use of evidence in constructing written and verbal claims. For example, in Module 1, Lesson 6, students explain how the water cycle and natural features create precipitation. Questions are provided to guide the lesson and sample student answers are located under each question. After the first two questions are posed to the class, the teacher uses students' responses to add evidence to the anchor evidence organizer chart. As a class teacher leads the students to review a map. Students are asked to share what they notice. Next, students are given a Conceptual Checkpoint page where students use information from the model to explain why one location receives more rainfall than another. A sample response is provided for the teacher. At the close of the lesson, teachers ask if their new knowledge can answer their questions. Students can agree or disagree using nonverbal signals and then record their new questions on the driving question board.

- In Module 2, the teacher is prompted to facilitate a Socratic Seminar to answer a question about how trees support life. On the sidebar note, there are instructions to guide teachers through the Socratic Seminar so that all students can productively share ideas. Teachers are provided a note in the sidebar explaining that students remind one another of conversation norms, ask each other for evidence, and ask questions. If the teacher needs to step in briefly to help then the teacher will assist.
- In Module 3, Lesson 7, materials provide the video, *One Year on Earth—Seen From 1 Million Miles*. Students watch the first minute of the video with no sound, then they Think-Pair-Share in response to the following questions: "Where do you think the Sun is in the video? Why do you think that? How did you know when Africa was experiencing daytime or nighttime? How can you tell when a day on Earth has passed from the DSCOVR satellite's perspective?"
- The materials provide guidance that teachers can use to provide feedback to students while engaging in discourse. For example, in Module 1, Lesson 9, students complete a Category Sort to identify the similarities and differences between different types of valleys. The materials provide group guidance to develop three categories. Students share their categories with the class. Sample student responses are provided for the teacher. Materials direct teachers to remind students that a canyon is a type of valley, and to place the cards with canyon photographs in a group. Then the teacher informs students that four of the six cards show a type of canyon called a river canyon and that the other two cards show a type of canyon called a slot canyon while displaying the photographs of slot canyons and river canyons.

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

- The materials provide teacher support and guidance to engage students' thinking in various modes of communication throughout the year. Materials provide teacher guidance for facilitating discussions in the form of sentence frames, sidebar notes, collaborative conversation prompts, open-ended tasks, and collaborative conversation routines and techniques. For example, in Module 2, Lesson 3, students think about how a seed becomes a tree and consider where plants get the matter they need to grow. A Teacher Note in the sidebar guides the teacher in facilitating thinking. Materials provide guiding questions for the teacher to support the discussion: "When a seed grows into a tree, is a new substance forming? How do you know? Besides soil and water, what other matter can be found around a tree?"
- The materials provide teacher support for facilitating the sharing of students' finding solutions. Materials provide feedback tips and examples teachers can use to support students throughout the learning cycle. For example, in Module 1, Lesson 11, students observe how the deposition of sediment by wind results in the formation of dunes. The material instructs teachers to put students in pairs to observe delta cards. Guiding questions and student sample responses are provided. After students explore the cards and provide their observations, the materials instruct the teacher to bring them together to add information that they learned to the class anchor chart. Students then explore a sand dune model.
- In Module 3, Spotlight Lessons on Forces, Motion, and Energy, Lesson 17, materials provide teacher guidance for drawing students' attention to the driving question board and inviting students to reflect on their new knowledge and what else they would like to learn. Teachers ask students to think about questions they answered during these lessons. Teachers pose questions to facilitate the discussion such as, "What did you do to answer these questions? Which answers surprised you? Why? Which questions relate to each other? How?"

Great Minds PhD Science Grade 5

Indicator 6.1

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

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

Meets | Score 2/2

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

Materials include a range of diagnostic, formative, and summative assessments that include formal and informal opportunities to assess student learning in a variety of formats. Materials assess all student expectations and indicate which student expectations are assessed. Materials include assessments that integrate scientific concepts and science and engineering practices with recurring themes and concepts. Materials include assessments that require students to apply knowledge and skills to novel contexts.

Evidence includes but is not limited to:

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

- Materials include benchmark assessments administered mid-year and at the end of the year. Level 5, Benchmark 1, should be administered after the Spotlight Lessons on Physical Properties of Matter, Benchmark 2 should be administered after the Module 2 End-Of-Module Assessment Debrief, and Benchmark 3 should be administered after Spotlight Lesson and Capstone Project on Forces, Motion, and Energy. The Benchmark assessment is optional and provides additional opportunities for evaluating students' understanding of content and their mastery of scientific and engineering practices and recurring themes and concepts. While benchmarks assess comprehensively, benchmark data tools only provide a general rubric rather than data pinpointing students' strengths and areas of needed growth.
- Materials include formative assessments in various formats to measure student learning and determine the next steps for instruction. Materials have Conceptual Checkpoints. In Module 1, Lesson 6, students circle the effect the Sun has on the water cycle of the Great Lakes and use the knowledge that they have learned to support the statement that they circled. Students complete an Engineering Challenge in Lessons 17-21 that requires them to apply the engineering design process to design and test a sustainable irrigation system. In Module 2, Lesson 7, students complete a formative assessment through a conceptual checkpoint. Students complete a Conceptual Checkpoint to demonstrate their understanding of how plant and animal

interactions with air are related and are necessary for growth and survival. For example, in Module 3, Lesson 13, students complete a Conceptual Checkpoint to demonstrate their understanding of sunlight's path to Earth. Teachers display the photographs of the Sun from Earth and space, distribute a copy of the Conceptual Checkpoint to each student, and direct students to the model, pointing out the Sun, the person on Earth, the atmosphere, and the ISS on the model. The teacher reads aloud the prompts and instructs students to record their responses on the Conceptual Checkpoint handout.

- Materials include summative assessments in a variety of formats. For example, in Module 1, Lesson 26, students complete a Socratic Seminar. Students use what they have learned to engage in discourse with their peers to explain how natural processes change Earth's surface and materials and can be affected by human activity. Students first use the terminology they have gained to create a relationship map. They will use this map to help them during their Socratic seminar. Next, students complete an End-of-Module Assessment on their own that involves short constructed responses requiring students to explain models, maps, and diagrams. The last summative assessment for this module is a Benchmark assessment, which is optional and provides additional opportunities for evaluating students' understanding of content and their mastery of scientific and engineering practices and recurring themes and concepts. In Module 2, Lesson 28, the summative End-of-Module Assessment allows students to demonstrate the knowledge and skills they have acquired throughout the module it pertains to ecosystems. Module 3, Lesson 16 materials provide the End-of-Spotlight Assessment by explaining that the assessment is a way to demonstrate the knowledge students have developed through their study of energy transformation and properties of matter.
- Materials include a variety of informal assessments that give teachers feedback on student learning in the moment so that they can modify instructional approaches. In Module 3, Level 5, Lesson 1, Check for Understanding, students use their outdoor observations to model and predict the location of the Sun at a particular time of day. Materials have students use the pattern of the movement of the Sun (5.5A) from their observations as evidence to explain (5.1E) where the Sun will appear in the future (5.9).

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

- The materials assess all student expectations, as outlined in the TEKS, by grade level. Materials display the TEKS for each question in the Alignment Map provided for each End-of-Module Assessment, Engineering Challenge, and Benchmark. For example, Benchmark 1 includes an alignment map that lists the TEKS assessed by each item in the Benchmark. Item 1, Integration of Standards, contains Content Standard 4.10A, Describe and illustrate the continuous movement of water above and on the surface of Earth through the water cycle and explains the role of the Sun as a major source of energy in this process; SEP 5.3A, Develop explanations and propose solutions supported by data and models; and RTC 5.5G, Explain how factors or conditions impact stability and change in objects, organisms, and systems. The End-of-Module Alignment Map shows the Content Standards, Scientific and Engineering Practices, and Recurring Themes and Concepts connected with each item. Question 1 assesses standard 5.10A, SEP 5.3A, and RTC 5.5B.
- The materials indicate which student expectations are assessed. For example, materials contain a Lesson Overview showing the End-of-Module Socratic Seminar, Assessment, and Debrief. The Lesson Overview includes the student learning expectations, TEKS covered, and ELPS. The materials indicate which student expectations are assessed in the summative benchmark at the

end of Module 1. The benchmark rubric contains a table that shows what student expectation is linked to each question number. It includes an answer key. In the answer key, there is a correct answer shown, and for each incorrect answer, it explains why it is wrong. A Benchmark Alignment Map contains a table showing the question number/item, Integration of Standards, Content Standards, Scientific and Engineering Practices, and Recurring Themes and Concepts. For example, Benchmark 3, Level 5 materials include a table that includes what TEKS are assessed by item number. The Benchmark 3, Level 5 table provides an answer key as well.

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

- The materials include assessments that require students to integrate scientific knowledge and science and engineering practices with recurrent themes appropriate to the student expectation being assessed. For example, Teacher Edition: Grade 5, Module 3, Sun, Earth, and Moon System, Lesson 25, provides a conceptual checkpoint where students explain why an eclipse causes Earth's sky to darken during the daytime and use the model to support their explanation.
- In Level 5, Module 3, Lesson 26, students engage in a Socratic Seminar. As students engage in scientific discussion, they identify patterns in daytime shadows or positions of the Sun, the Moon, and stars in the sky.
- Each module also contains an Engineering or Science Challenge where students must integrate scientific knowledge and science and engineering practices. For example, in the Module 1 Engineering Challenge, students apply the engineering design process to design and test a sustainable irrigation system. The Standards Addressed provides 13 different SEPs that are covered through the lessons and four RTCs that are addressed throughout the Engineering Challenge.

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

- Materials include assessments that require students to apply knowledge and skills to a new phenomenon or problem. For example, in Module 1, Lesson 6, students complete a Conceptual Checkpoint in which they must take what they have learned in Lessons 1-5 and apply it in Lesson 6. In the Conceptual Checkpoint, students investigate the movement of water in the Great Lakes region to determine why some areas receive more snowfall than others. Although the environment of the Great Lakes region is different from the environment of the Chihuahuan Desert, students can apply their new knowledge of the water cycle and demonstrate their understanding of the Concept 1 Focus Question, "What can a desert reveal about Earth's water?" as they investigate.
- In Level 5, Module 2, Lesson 22, students apply their knowledge of the relationship between food and the indicators of energy and complete a Conceptual Checkpoint by modeling the flow of energy through the mangrove tree ecosystem, tracing the flow of energy back to the Sun.
- Students complete an engineering challenge that requires them to build on their understanding of how the conservation of natural resources impacts the environment and apply their understanding of surface materials and processes to develop a solution to conserve water people use for agriculture. They define a problem and conduct research on water use along the Rio Grande. Students then use the engineering design process to develop solutions to conserve water used for agriculture and to reduce the impacts of natural resource use.
- In Module 2, End-of-Module Assessment, students observe the Raine Island ecosystem model and the phenomenon of turtles leaving their nests and moving toward water. Students use

evidence from the model to explain how this is an instinctual behavior. Students then answer questions about abiotic and biotic factors that help ghost crabs survive using evidence from the same model.

- In Module 3, Sun, Earth, and Moon System, Lesson 26, students write a response to the Phenomenon Question, "How can we explain our observations of the Sun, the Moon, and stars from Earth?" Students then participate in a Socratic Seminar to discuss their response to the Phenomenon Question. During the seminar, students use evidence-based conversation, applying the knowledge they have developed in the previous lessons.

Great Minds PhD Science Grade 5

Indicator 6.2

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

1	Materials include information and/or resources that provide guidance for evaluating student responses.	M
2	Materials support teachers' analysis of assessment data with guidance and direction to respond to individual students' needs, in all areas of science, based on measures of student progress appropriate for the developmental level.	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 include information that guides teachers in evaluating student responses. Materials include follow-up suggestions for formative assessments in the Teacher's Guide, examples of acceptable answers for evaluating student responses, and suggested teacher actions to address student learning gaps in lessons and units. Materials guide teachers to look for specific components when evaluating student responses. For example, Module 1, Lesson 7, provides a Check for Understanding box. This box provides the TEKS being assessed and the evidence that students provide. If students do not provide the appropriate evidence, the box contains suggestions for Next Steps to support student learning. One piece of evidence in this box states, "Students use the mountain model to explain that precipitation in the mountains can lead to the formation of a river and valley as water flows downhill." The Next Steps suggestion is, "If students need support to explain how the water forms the valley, invite them to observe the mountain model up close and point out the low areas in the mountains where water collects and flows downhill." The materials provide an End-of-Module assessment that requires students to answer with short, constructed responses. A rubric is provided to support teachers in evaluating student answers. The rubric describes evidence of student work that meets expectations. Blanks are provided for teachers to print the rubric and fill out while evaluating. Question 1 has students evaluate two images and then, "Circle two predictions that describe

how the water cycle in Antarctica will change from summer to winter." The rubric states, "The student uses a model to predict (5.3A) that a decrease in sunlight will result in less ocean water evaporating and less water vapor condensing into clouds" to meet expectations.

- Materials include resources that guide teachers in evaluating student responses. The implementation guide and the Teacher Edition Module contents include the Rubric for students' use, and the End-of-Module materials include resources that guide teachers in evaluating student responses. Each module has one Engineering or Science Challenge with an accompanying rubric. Each module has one End-of-Module Assessment and accompanying rubric. Each Benchmark includes a rubric and an alignment map. The alignment map includes details on the standards addressed for each item. For example, Module 1 contains an Engineering Challenge spread through Lessons 17-22. In the lessons, there are sample student responses to support the teacher throughout the process. A rubric also provides directions stating, "Score each student's engagement in the Engineering Challenge. The rubric describes evidence of student engagement that meets expectations for each stage of the engineering design process. Use the blank spaces as needed in the rubric to record evidence of student work that exceeds or falls below expectations."
- In Level 5, Module 2, Lesson 28, the Teacher`s Note in the Learn section states, "To prepare for the next lesson, review End-of-Module Assessment responses to provide rubric scores and actionable feedback to students on a separate page from the assessment. When providing feedback, be sure to guide students to focus on specific areas of improvement to deepen their understanding of module concepts. For students who need remediation, offer opportunities to revisit portions of the module."
- Benchmark 3, Level 5 includes a rubric. The rubric describes evidence of student work that meets expectations. The teacher can use the Score column to record the student's points for each item.

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. Materials provide guidance documents and resources to support teachers' analysis of assessment data. For example, two Benchmarks are provided. Guidance on when to administer the Benchmarks can be found in the Implementation Guide. Materials provide a rubric, answer key, and an alignment map. The alignment map includes details on the standards addressed for each item. Materials provide suggested steps for teachers to follow or questions for teachers to ask themselves when interpreting student data in the Implementation Guide. Materials provide questions to ask students.
- Materials provide guidance documents and resources to support the teacher's interpretation of the data. Module 1, Lesson 6, Conceptual Checkpoint, Evidence, instructs teachers to have students use a model of the Great Lakes water cycle to identify the cause-and-effect relationship between the Sun and the increase of water vapor in the air. The Next Steps provides, "If students need support to identify the effect of the Sun on the water cycle, consider revisiting their precipitation models and asking a question such as the following: Which process of the water cycle relies most on energy from the Sun?" The formative assessments in the modules provide additional support for teachers, such as the Conceptual Checkpoints and Check for Understanding.

- Materials provide guidance and tools to support teachers in responding to data to inform instruction. The formative assessments and informal assessments in the modules provide additional support for teachers, such as the Next Steps in the Conceptual Checkpoints and Checks for Understanding. Materials provide rubrics for each student for Benchmarks and the End-of-Module Assessments. The individual student rubrics have the teacher score the student's assessment based on each item, providing a rating scale of 1-4. A score of 1: Does Not Yet Meet Expectation, indicates an incorrect or unreasonable response with no detail or evidence. A score of 2: Approaches Expectation indicates an incorrect or unreasonable response with some detail or evidence OR a correct or reasonable response with insufficient detail or evidence. A score of 3: Meets Expectations, indicates a correct or reasonable response with sufficient detail or evidence. A score of 4, Exceeds Expectations, indicates a correct or reasonable response with more than sufficient detail or evidence. Materials provide data trackers that help teachers categorize students by skill mastery or suggestions on groupings in the Implementation Guide.
- Materials include assessment tools that yield data teachers can easily analyze and interpret. The teacher must use the evidence to understand student mastery using the skills provided. For example, the End-of-Module assessment provides sample answers for the teacher. Materials also provide a rubric to use while grading the assessment. The rubric includes item numbers, TEKS assessed for each question, and the meets description.
- Materials provide answer keys and rubrics and explain how to interpret the data. The materials instruct teachers to prepare for the next lesson and review End-of-Module Assessment responses to provide rubric scores and actionable feedback to students on a separate page from the assessment. The materials provide Assessment trackers to categorize students by skill mastery and suggest instructional groupings, including reteaching and extension. Materials provide clear criteria for moving a student from one proficiency level to the next. Assessment tools provide user-friendly trackers that demonstrate progress toward mastery of grade-level content skills. Assessment tools require teachers to analyze students' evidence and provide feedback.

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 core science instruction. Materials provide Next Steps during the informal assessments of Checks for Understanding and the formative assessments of Conceptual Checkpoints. For example, in Module 1, Lesson 1, Check for Understanding, students make observations about the Chihuahuan Desert using the pictures to ask questions. The Next Steps provide support for students who need assistance with making observations. The next Check for Understanding is in Lesson 2, where students develop a model of the Grand Canyon, and the Next Steps provide support in identifying key features. Then, in Lesson 3, students draw a precipitation model to explain that energy from the sun causes water to evaporate, and the Next Steps prompt students to observe the physical model up close and review with the teacher what each model component represents. These mini-assessments support teachers in identifying which students are struggling before they get to Lesson 6 for the Conceptual Checkpoint. In the Conceptual Checkpoint, students observe a model to explain why one location receives more snowfall, and then students provide an explanation of how the lake affects snowfall. Each part of the Conceptual Checkpoint was practiced in an earlier part of the Concept, allowing teachers to utilize the Check for Understanding to support students in mastering the Conceptual Checkpoints.

- The information gathered from the assessment tools helps teachers when planning differentiated instruction. Materials offer support in the Next Steps provided in the Conceptual Checkpoints and Checks for Understanding, but not for the End-of-Modules or the Benchmarks. In Level 5, Module 3, Lesson 13, Conceptual Checkpoint, materials provide the Next Steps for teachers to help plan instruction. For example, “If students need support depicting refraction, revisit the laser light photographs and ask students to explain why the light ray is bent. Then, ask questions such as, ‘Will a ray of sunlight get bent on its path to a person on Earth? Why?’ If students need support depicting the straight path of light from the Sun to the ISS, revisit the class light model and have students describe the path of a light ray from a light source to an object. If students need support justifying their drawings, ask guiding questions such as, ‘Why does the light ray traveling to Earth’s surface get refracted? Why does the light ray traveling to the ISS not get refracted?’"
- The Benchmark provides an individual student rubric and an alignment map but no further teacher guidance. Materials provide multiple data trackers that allow the teacher to sort students into groups to best support 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. Materials provide a variety of activities that a teacher can implement, and the materials contain student resources to be used in response to data. The Implementation Guide contains a section titled “Implementation and Instructional Resources” that provides additional activities for students to review and practice. For example, each lesson has a Check for Understanding box. If students struggle to answer the Check for Understanding, the materials suggest the next step to support student learning. Sidebar Teacher Notes also offer suggestions and tips for teachers if students are struggling with the material. Optional homework is provided for each lesson that teachers can use in any manner that they see fit.
- The Next Steps describe how teachers can respond to student data by providing questions to focus student responses. For example, in Level 5, Module 2, Lesson 13, the purple Check for Understanding box includes a next steps section that guides teachers, stating, "If students have difficulty making or supporting their claim, remind students of how other organisms obtain matter for growth. Revisit learning from Lessons 3 through 5 about plant growth and Lessons 8 through 9 about animal growth. Have students consider the types of matter the mold can access within the containers. Point out that while the raspberries seem to be getting smaller, their matter cannot be destroyed or leave the system, so they are likely a source of matter for the mold."
- Materials provide a variety of teacher guidance for responding to student data. Materials provide guidance in the informal assessments of Checks for Understanding and the formative assessments of Conceptual Checkpoints. For example, in Module 1, Lesson 6, students complete a Conceptual Checkpoint. Materials provide step-by-step instructions for giving the Conceptual Checkpoint. Sample student responses are provided for the teacher.
- In Module 3, Lesson 6, in Next Steps, materials provide an activity stating that if students need support identifying evidence from peer explanations, teachers direct students to circle parts of the system on their model that are similar to those of their peers and to list different system features. Teachers pause to review how to model the interaction of these systems on paper. Teachers ask members of the class to model the Earth’s movement from east to west while the Sun stays in one place. Teachers point out that the Sun appears to move across the sky because

the Earth is moving. In Module 3, Lesson 3, Next Steps, the materials state, "If students need support identifying patterns in their data, have them compare their results to another group's results to find similarities." Teachers ask students to record the patterns in the evidence column in their chart, use the evidence to complete the reasoning, and explain how different forces affect the motion of the model train car in the system.

- Module 3, Lesson 12 materials provide a Check for Understanding, in which students are asked to provide evidence from photographs to explain that passing from one medium into another medium causes a light ray to bend. Materials include Next Steps for students needing support with the Check for Understanding. The Next Steps suggests, "If students need support explaining how the path of a light ray changes when passing from one medium into another, provide students with a quick hands-on activity." Materials suggest the teacher provide students with an object that has straight edges and an index card and instruct students to align the edge of the object with the incoming light ray in the photographs. Materials guide the teacher in focusing the students on the light's path and where the change occurs.
- The Materials provide Next Steps for the End-Of-Module Assessments, End-of-Spotlight Assessments, and Benchmarks and are listed by module. For example, Level 5, Module 1, Physical Properties of Matter, End-of-Spotlight Assessment Part A, offers the following Next Steps if a student gets question 1a incorrect: "To provide support with collecting observations as evidence to compare the mass of matter samples, review materials found in Lesson 2 with students."

Great Minds PhD Science Grade 5

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 for the grade level that are scientifically accurate. For example, the End-of-Module Assessment contains a model that accurately shows that Antarctica has sun 24 hours a day in the Summer and no sun 24 hours a day in the Winter. In Module 2, Lesson 7, the Conceptual Checkpoint contains a guide for students to demonstrate their understanding of how plant and animal interactions with air are related and are necessary for growth and survival. The information could be considered scientifically correct as the materials cite the referenced scientific source of the information. In Module 3, Sun, Earth, and Moon System, End-of-Module Assessment, question 2C states, "Circle the statement that explains why the milepost's shadow changes. " The materials accurately give the scientifically correct answer that the shadow changes because the Earth rotates on its axis.
- Assessments contain items for the grade level or course that avoid bias. For example, Benchmark Assessment 1 uses various images and photographs in the assessment questions. The photographs are from diverse locations such as the Drava River, sand dunes over a road, Santa Elena Canyon, and Grand Canyon. In Module 3, Lesson 13, Conceptual Checkpoint, materials direct students to the model and point out the Sun, the "person" on Earth, the atmosphere, and the ISS on the model. The person on earth is not distinguished to be male or female. Students use this to complete the Conceptual Checkpoint.
- Assessments contain items for the grade level or course that are free from errors. Throughout the materials, assessments contain items for the grade level and course that are free from errors.

- For example, the End-of-Module Assessment contains items for the grade level and course that are free from errors. In Module 2, Lesson 22, the Conceptual Checkpoint Assessment guides students to demonstrate their knowledge of energy flow in ecosystems and explain how forces and energy interact within a system. The assessment does not contain errors. For example, Benchmark 3, Level 5, includes accurate tables with science terms such as relative density, sink, or float. Materials include correct measurement units such as g and mL.

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

- Assessment tools use clear pictures and graphics. For example, in Benchmark 1, question 6 shows a photograph of the Drava River and a graphic of the Drave River. The graphic shows areas that have land with sediment only and areas with water with sediment. Both the picture and graphic show sediment on land and sediment in the water to help the student to identify the processes that affect the sediments. The End-of-Module Assessment provides a photograph of Taylor Valley in Antarctica. The photograph has sedimentary rock layers labeled and a blank square in one layer. The picture is clear and easy for students to use to determine which compaction arrow should be added to the photograph to show how sedimentary rocks are formed.
- In Module 2, End-of-Module Assessment, pictures and graphics embedded in the assessment are clear and allow the students to clearly understand the questions. In Module 3, Sun, Earth, and Moon System, End-of-Module Assessment, question 5 materials include a model of the Earth, Sun, and arrow of a light ray pointing in the direction of the flagpole on Earth. The image of the model is clear. Module 3, Sun, Earth, and Moon System, End-of-Module Assessment, provides grade-level appropriate images of a Sun and Earth model.
- Assessments contain pictures and graphics that are developmentally appropriate. For example, in Benchmark 1, question 10 uses two graphics. Each graphic is of a glacier in the mountains. The graphics are appropriate for the grade-level skills and support students in explaining how the sediment in the graphics moved.
- In Module 2, Lesson 17, students complete a Conceptual Checkpoint to demonstrate their understanding that instinctual and learned behaviors are important to animals, using a photograph of the whooping crane migration photograph. The resource for the Conceptual Checkpoint provides developmentally appropriate clear pictures for grade 5 to assess student knowledge. Level 5, Module 3, Sun, Earth, and Moon System, End-of-Module Assessment, question 1, shows pictures of milepost shadows. Module 3, Sun, Earth, and Moon System, End-of-Spotlight Assessment, also provides an accurate table titled Materials Properties. The table includes what the material is made of and whether it is an electrical conductor or a thermal conductor.

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

- Materials provide clear guidance for teachers to consistently and accurately administer assessment tools. For example, Module 3, Sun, Earth, and Moon System, Lesson 26, provides teacher instructions on how to prepare students for a Socratic Seminar. Materials guide the teacher to let students know that they will share their understanding of the Essential Question with one another through a Socratic Seminar discussion. Materials guide the teacher to instruct students to write an initial response to the Essential Question: "How can we explain our observations of the Sun, the Moon, and stars from Earth?" The teacher instructs students to respond to the Essential Question as a Quick Write in their Science Logbook. Materials guide the

teacher to review Socratic Seminar procedures and guide students through the discussion of the Essential Question.

- Materials include instructions for each assessment. For example, in Level 5, Module 3, Complete the End-of Module Assessment provides instructions for teachers. Materials state, "Prepare students for the End-of-Module Assessment by explaining that the assessment is a way for them to show the knowledge they have developed through their study of the apparent motions of the Sun, the Moon, and stars from Earth. Explain that in the End-of-Module Assessment, students will use their observations of the Sun-Earth system to explain why unusual shadow patterns occur in some places on Earth." The teacher has the students watch a video and have a small discussion before displaying the milepost in Hawaii photograph and distributing the End-of-Module Assessment. Materials instruct the teachers to "tell students they will use the photograph from the video to help them answer some of the assessment questions. Give them time to look over the photograph. Read aloud the assessment items. Students complete the End-of-Module Assessment individually. If needed, provide additional time for students to finish."
- The materials include detailed information that supports the teacher's understanding of assessment tools and their scoring procedures. The materials include detailed information that supports the teacher's understanding of assessment tools and their scoring procedures. Materials provided in the teacher edition sample answers for the End-of-Module Assessment. The rubric states, "Score each student's End-of-Module Assessment. The rubric describes evidence of student work that meets expectations. Use the blank spaces as needed to record evidence of student work that exceeds or falls below expectations." The alignment map provided lists the TEKS by each item number and includes the content standards, scientific and engineering practices, and recurring themes and concepts.

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 some accommodations for assessment tools so that students of all abilities can demonstrate mastery of learning goals. For example, materials provide some accommodations in Module 3, Lesson 10, Differentiation, for teachers to allow some students additional time and support to prepare for an oral presentation, stating, "Provide students with time to rehearse each part of the presentation before the whole class presentation. Consider providing students with index cards and allow them to write notes on the cards for reference during the presentation."
- Materials provide suggestions of how teachers may accommodate assessments. The Implementation Guide states, "Students engage with assessment tasks in a variety of ways, and teachers may modify assessment items as needed while preserving scientific rigor." Materials add, "Some students may need additional processing time and support as they complete assessments. To evaluate students' scientific understanding, teachers may need to read items to some students or allow students to answer orally with a scribe. Students may complete assessments individually or in groups; however, when using formative assessments summatively, teachers should evaluate individual student contributions rather than group performance." For example, materials provide a Conceptual Checkpoint that offers a Differentiation sidebar note that states, "Read aloud questions to students who need support to complete the Conceptual Checkpoint. If students need support with the models, consider working with individual students or with small groups of students to explain (4G)." Materials

offer guidance for teachers to provide accommodations for assessment tools so that students of all abilities can demonstrate mastery of learning goals.

- For example, the teacher sidebar note on Level 5, Module 1, Lesson 24, page 254, for Differentiation, states, "Provide an audio recording of the assessment items for students who need additional reading support." In Level 5, Module 2, Lesson 28, instruction is provided for the teacher to "Read aloud the assessment items." In Level 5, Module 2, Lesson 28, End-of-Module Assessment, teacher guidance about accommodation is provided in the sidebar: "Provide an audio recording of the assessment items for students who need additional reading support." Teacher Edition: Grade 5, Module 3, Sun, Earth, and Moon System, End-of-Module Assessment materials provide a sidebar differentiation suggestion. Materials suggest, “Provide an audio recording of the assessment items for students who need additional reading support.”

Great Minds PhD Science Grade 5

Indicator 7.1

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

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

Meets | Score 2/2

The materials meet the criteria for the 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 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.

- The materials include teacher guidance for scaffolding instruction and differentiating activities for students who have not yet achieved mastery. Lessons include embedded support, labeled "Differentiation," to support all students in meeting the lesson goals, including accommodations for activities and assessments as necessary.
- For example, the material provides differentiation sidebar notes for teachers. In Module 1, Lesson 1, a Teacher Note suggests having students reread an assigned poem with a partner and demonstrate movements that represent parts of the poem.
- In Module 3, Lesson 1, after reading "Polynesia's Genius Navigators," students complete the Boxes and Bullets text-based routine to capture the main ideas and key details. Materials provide teacher support on Differentiation for students who would benefit from additional scaffolding. As students identify the main idea and key details of the text, the teacher provides the following questions to guide student thinking: " Who is the focus of this article? What did they do? How did they accomplish what they set out to do?"
- In Module 3, Lesson 5, Draw a Ray Diagram, embedded support, "Differentiation," includes information that students may need additional scaffolding as they draw a ray diagram to represent how shadows change. Teachers should consider working with the whole class or a small group to first draw a ray diagram to represent the investigation in Lesson 4, showing how the angle of the light affected the length of the pencil's shadow. Students can use rulers to draw straight lines for light rays. They can see how some rays are blocked by the pencil, making a shadow appear on the opposite side of the pencil where light rays do not reach.
- Materials ensure that teachers can **target instruction to develop precursor skills** necessary to access grade-level content. Materials provide instructional practices to help teachers

implement lessons such as student groupings, reading complex texts, videos and images, and models and investigations.

- For example, Module 2, Pre-Assessment, "provides recommended next steps for instruction to support learners with limited or inaccurate prior knowledge related to how models can be used to show relationships in ecosystems." In the chart labeled "Check for Understanding," teacher instructions are given to help scaffold for misconceptions or lack of understanding for students, stating, "If students need support to model organism interactions, present students with two organism cards at a time. Ask students to revisit the information they recorded from The Mangrove Tree in their Science Logbook. Guide students to describe how the organisms interact and, if they do interact, how they could model the interaction with an arrow."
- In Module 3, Lesson 14, students work in groups to show where the Moon must be located for it to be visible from Earth at night. Students then share with other groups where they placed the Moon on their model and explain their reasoning. Materials provide a sidebar note for the teacher to support students during their presentation to the other group. The note suggests that the teacher "refer students who need extra support to their anchor model drawing from Concept 1 and review how the space-view model was used to model the location of the Sun."
- Materials provide additional resources for targeted instruction and differentiation to support students who have not yet achieved mastery. For example, in Module 3, Lesson 4, students investigate how the angle, distance, and direction of a light source affect shadows. Students review their testable questions and write one prediction about the effect each variable will have on shadow length. Materials provide a Differentiation note for the teacher to consider providing the following sentence frame for developing writers: "If…, then…because…."
- The embedded support, "Check for Understanding," in Module 3, Lesson 5, Determine the Direction of the Sun's Apparent Motion, includes materials for students to explain how the Sun appears to move in the sky and how this motion affects shadows throughout the day. In Next Steps, materials provide instructions if students need support explaining the apparent east-to-west movement of the Sun during the day, to revisit the investigation from Lesson 4 and model the apparent motion of the Sun in the classroom with the light source, and to also revisit the evidence that shadows move from west to east. Teachers guide students to model how the light source must be moving from east to west to cause this west-to-east movement of shadows.

Materials provide enrichment activities for all levels of learners.

- The materials provide enrichment activities that account for learner variability. For example, materials provide Extension activities in the sidebar of the lessons. In Module 1, Lesson 4, students are investigating cloud formation. The extension suggestion is to place double-sided tape on an index card and leave it exposed for some time. Then come back and check to see what landed on the exposed tape.
- In Module 2, Lesson 12, students identify instincts and learned behaviors to explain how they enable animals to survive. Students observe animal cards and record observations of the animals' physical, instinctual, and learned behavioral traits. After completing a Check for Understanding, the materials provide in the sidebar an extension activity about additional research that students on all levels may conduct using an outside resource and provides the Texas Wildlife website.
- In Module 3, Lesson 6, students learn about Galileo and what he was able to see through his telescope. Materials provide an extension piece for students curious about modern evidence supporting the Sun-centered model of the solar system, introducing them to the Voyager

project. In Module 3, Lesson 8, students work on making a shadow clock. Materials provide an idea for students to engage in an Extension. In the Extension, students follow actual shadows caused by the Sun throughout the science challenge in Lesson 8. Students can track how the Sun's position changes within a class period or hour by hour, or try to identify when solar noon occurs in their location by determining the time at which shadows fall due north.

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

- The lessons include recommendations for just-in-time scaffolds to develop productive perseverance of learning in the moment. For example, in Module 1, Lesson 7, materials provide questions and sample student responses in the lesson outline. Students go outside during the launch to explore how water interacts with different surfaces outside. Three questions are provided to promote student thinking. Sample answers are given for the teacher to anticipate or restate questions to direct student thinking. Students then observe a mountain model. Guidance for how to run the investigation is provided along with directions to steer student observations. For example, materials in Lesson 7 also provide sidebar Teacher Notes such as a Differentiation suggestion for students to use numbers rather than nonspecific words in their descriptions.
- In Module 2, Lesson 13, the evidence box in the Check for Understanding guides the teacher in what learning should be evident at this point in the lesson: "Students use observations of the interactions between the organisms (5.12A) to explain (5.3A) that mold gets matter for growth from dead raspberries (5.5E). If students have difficulty making or supporting their claim, remind students of how other organisms obtain matter for growth. Revisit learning from Lessons 3 through 5 about plant growth and Lessons 8 through 9 about animal growth. Have students consider the types of matter the mold can access within the containers. Point out that while the raspberries seem to be getting smaller, their matter cannot be destroyed or leave the system, so they are likely a source of matter for the mold."
- In Module 3, Lesson 15, materials ask the teacher to challenge students to work with their space-view model materials to explain how the Moon can be in different locations around Earth. Students then update their models in their Science Logbook. In Module 3, Lesson 3, materials provide Check for Understanding Next Steps which guide teachers in the following: "If students need support explaining the role of light rays in forming a shadow, ask guiding questions such as these: Do light rays travel in a straight line forever? What happens to light rays once they reach the arch?"
- Lessons provide support and resources for students who are ready to accelerate their learning. In Module 3, Lesson 21, the "Extension" embedded support provides students with additional information about the Hubble Space Telescope. The materials provide information that the telescope can detect infrared and ultraviolet rays invisible to humans. The telescope can detect many stars because it is beyond Earth's atmosphere (2E).
- In Module 3, Lesson 6, materials provide a sidebar note for the teacher to guide students that are advancing during the lesson. Materials suggest, "If groups have already developed a model in which the Sun was stationary, instruct them to develop the model again with students in new roles. Have a discussion of whether they can change or add anything to the model to make it more accurate."

Great Minds PhD Science Grade 5

Indicator 7.2

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

1	Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content.	M
2	Materials consistently support flexible grouping (e.g., whole group, small group, partners, one-on-one).	M
3	Materials consistently support multiple types of practices (e.g., modeled, guided, collaborative, independent) and provide guidance and structures to achieve effective implementation.	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 of the 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 engage students in mastery of the content through a variety of developmentally appropriate instructional approaches. For example, throughout each module, students engage in the learning cycle to make sense of and explain the Anchor Phenomenon and supporting phenomena. The Content Learning Cycle includes the five content stages shown in the following: Wonder, Organize, Reveal, Distill, and Know. Each part of the Learning cycle builds and allows the student to experience the content in a different format.
- Materials include a table that lists instructional routines that appear in the lessons. The table organizes the routines by main purpose. The sections for instructional routines include Collaborative Conversation Routines and Techniques, Written Response Routines, Terminology Learning Routines, and Text-Based Routines. Materials include a variety of developmentally appropriate instructional approaches to engage students in the mastery of the content by beginning each lesson with a phenomenon and phenomenon question. For example, in Module 1, Lessons 7-9, students look at a painting of a desert and share their ideas on how the landscape changed over time. Once students have formulated their thoughts, they then watch their teacher demonstrate a model of precipitation on a mountain. Students then, "use models

under different conditions to determine how the Rio Grande might affect the land of the Chihuahuan Desert. We compare the results of our models and notice that the shape of a valley depends on the conditions under which it formed."

- In Module 2, Lesson 6, Jot-Pair-Share allows individual students to consider and jot their thoughts about the question, "Write a prediction that describes how the amount of carbon dioxide over the Amazon rainforest during the day compares to the amount of carbon dioxide at night." Students explain the reasoning before collaboratively discussing the question with peers.
- In Module 3, Sun, Earth, and Moon System, Lesson 15, materials provide the opportunity for students to work in groups. Materials guide teachers to provide students with space-view model materials. Students are challenged to model the positions of the Sun, Earth, and the Moon that would cause the Moon to be visible during daytime. Students are allowed time to discuss with their group and work with the model materials. Students then individually draw the model in their Science Logbook.

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

- The materials support a variety of instructional groupings (e.g., whole group, small group, partners, one-on-one). For example, the Implementation Guide provides a table with categorized instructional routines. Each routine has a suggested grouping. When looking at the written response routines a teacher could select a group routine, such as Chalk Talk, or an individual routine, such as Quick Write.
- In Module 2, Lesson 6, students work with their group to analyze results and create a model to show the interaction of gases in and out of a leaf at night. The activity is then summarized as a whole group. Next, students work independently using their leaf models to write a prediction about the carbon dioxide amounts in the Amazon Rainforest. Students then pair up to share their predictions in a Jot-Pair-Share routine.
- In Module 3, Lesson 4, students work in groups to conclude their shadow data. The teacher then works with the class to complete a cause-and-effect chart that compiles class results. During Lesson 5 of Module 3, students use a shadow photograph to complete a notice and wonder chart in their Science Logbooks (Independent). Students observe the shadow outside to determine the location of the Sun throughout the day (Guided). Students work in pairs to use a compass to identify the direction the shadows are moving (Collaborative).
- In Module 3, Lesson 15, materials allow students to work in pairs or groups of three to analyze moonrise and moonset data.
- The materials provide guidance to teachers on when to use specific grouping structures based on the needs of students. For example, materials explain in the instructions of the lesson whether students are working independently, in groups, or in whole groups.
- The material provides a suggestion for English language learners, stating, "Grouping students who speak the same home language at complementary proficiency levels can provide additional scaffolding by allowing English learners to converse in their home language, thereby supporting English comprehension and understanding." The Implementation guide also provides guidance on student grouping with diverse abilities to bring students together with complementary skills. It also suggests grouping students with similar abilities when needing them to collaborate. Tthe materials include sidebar notes and Check for Understanding boxes that the teacher can use to support concept acquisition.

Great Minds PhD Science Grade 5

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

- The materials provide multiple types of **practices** (e.g., modeled, guided, collaborative independent)**.** The Teacher Edition clearly describes the actions of the teacher and the student and when the activities are to be a class demonstration, teacher-guided, collaborative learning, or independent practice.
- For example, in Module 1, Lessons 13-14, students use models to show how sedimentary rocks are formed, then use diagrams to explain the process and work collaboratively to generate an explanation of the rock formation process. Students work in pairs to create their models and then work as a class to discuss the process. Students collaborate in a Think-Pair-Share to answer teacher prompts.
- In Module 2, Lesson 2, students independently use a set of organism cards to model interactions described in *The Mangrove Tree*. Then, students work collaboratively with a partner to compare models and record similarities and differences. Finally, the teacher guides students to work together as a class to develop the Mangrove Tree Ecosystem anchor model. In Module 2, Lesson 19, students work collaboratively in groups to categorize a set of animal cards. They then independently record their findings in their science logbook.
- In Teacher Edition: Grade 5, Module 3, Sun, Earth, and Moon System, Lesson 3, materials provide an opportunity for students to collaborate with a partner to complete a comparison chart in their Science Logbook, about two photographs showing the St. Louis Arch. In Module 3, Lesson 7, students update the anchor model with new information, including the rotation of the Earth. Teachers use the Mix and Mingle collaborative conversation routine while asking questions to guide the discussion.
- The materials provide teacher guidance and structures for the effective implementation of multiple types of practices. Every module throughout each lesson provides opportunities for students to different types of practice to lead to mastery. For example, Level 5, Module 3 includes embedded supports, "Teacher Notes," "Differentiation," and "Check for Understanding."
- In Module 1, Lesson 14, safety notes are provided for the teacher for the investigation at the start of the lesson. Instructions guide the teacher in the flow of the lesson from the introductory phenomenon to question prompts throughout the lesson. During each step of the lesson, instructions and sample responses from students are provided for teacher anticipation. Sidebar notes are listed that prompt teachers to review previously learned knowledge for a foundation to build on in the lesson. An Extension activity is provided for the teacher that connects RLA to science by reading a poem. Students use the poem to connect their learning about sedimentary rock formation. A Check for Understanding box is provided with Next Steps if students do not meet the evidence provided.
- In Module 3, Lesson 1, materials provide a guided implementation piece for the Launch part of the lesson. Materials also provide specific questions for teachers to help facilitate student engagement. In Module 3, Lesson 15, materials guide the teacher to do the following: "Highlight student responses that indicate that the Moon in the photograph is visible during daytime, while their class models only showed the visibility of the Moon at night. Ask students to briefly Think–Pair–Share a possible explanation for the photograph and then generate a list of questions students now have about the Moon."
- Materials include teacher guidance on using metacognitive strategies with students, including ways to support students in planning and organizing independent projects, directing their own

learning through exploration, and self-reflection to assess their own knowledge, thinking, and 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, the Implementation Guide in "Characteristics of Rich Phenomena" describes the social context of the materials using phenomena to exhibit enduring significance in diverse cultures and content areas.
- Module 1, Lesson 18, resource A, has an image of a farmer in the field labeled "Farmer Observing Field Photograph." This is the only picture in module 1 that shows a person. Materials use real-world examples of landforms throughout the materials and represent a diversity of places across the U.S. and countries around the world. Materials represent diverse places such as the Chihuahuan Desert, El Paso, Mexico, Great Lakes, Rio Grande, and Big Bend National Park. Materials include landform pictures from different areas around the globe such as Namibia, Italy, Iceland, Wales, and Peru.
- In Level 5, Module 2, Lesson 1, students learn from the text what life was like in Hargigo before and after the mangrove trees were planted, sparking students' interest in learning the role of trees to humans and other organisms in an ecosystem. "After reading, discuss the challenges the people of Hargigo faced."
- In Module 3, Lesson 1, materials include a map of the Pacific Ocean and the Polynesian Triangle, which students observe and answer questions about. In Module 3, Lesson 6, materials include a story about Re and Nut which is an Ancient Egyptian story. In Module 3, Lesson 12, materials provide a "Cloudy Philippine Sea" photograph taken from the International Space Station. The photograph shows a sunrise. In Module 3, Lesson 27, materials provide information about an event in Hawaii, called Lahaina Noon. Students apply their understanding of the Sun–Earth system as they answer the Phenomenon Question: "Why does Lahaina Noon happen in some places on Earth?"

Great Minds PhD Science Grade 5

Indicator 7.3

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

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

Evidence includes but is not limited to:

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

- Materials include linguistic accommodations commensurate with various levels of English language proficiency as defined by the ELPS. The Implementation Guide includes support for teachers that provide explanations of collaborative conversations, grouping, the explicit introduction of terminology, and sentence frames and word banks. The material provides teacher support boxes in lesson instructions titled "English Language Development." For example, in Module 1, Lesson 1, a sidebar note is provided for the teacher to support students with the terms *erosion* and *weathering*. The box provides the Spanish cognate *erosión* and has students recall the definitions of terms used from Level 4.
- Materials include sidebar references that demonstrate ELPS connections by referencing the language of the ELPS or their specific outline location administrative code and how the lesson supports any given ELPS. For example, in Module 1, Lesson 14, a sidebar note provides suggestions for the teacher to explain the meaning of *marble*. The sidebar note says, "Support students' understanding of the term marble by displaying a photograph of a marble rock sample and pointing out the patterns in the rock. Then display a photograph of a slice of marble cake, and explain that people gently mix dark and light cake batter to form the streaks and swirls in the cake that resembles the color patterns in marble rock. Consider providing students with examples of other objects that have similar streaks, such as glass sculptures, toy marbles, or marbled paper (4F)."
- In Module 2, Lesson 23, a Teacher's Note labeled "English Language Development" guides teachers about unfamiliar words and how illustrations can lead to a better understanding of the

context. “After reading aloud an important word that is likely unfamiliar to students, stop and briefly define the term and provide an example sentence. Then, reread the text’s sentence without interruption and continue reading. Unfamiliar terms important to students’ understanding of this article may include larvae, circulatory system, integral, extinction, exclusively, temporarily, toxic, and canopy gaps. English learners may benefit from additional vocabulary supports such as images illustrating these terms (4F).” In the Level 5, Module 2 lesson, a Teacher's Note in the sidebar labeled “English Language Development” guides teachers, providing a word bank for students that can be used for the lesson to help students better engage in the lesson’s Socratic Seminar, including words such as *ecosystem, organism, environment, matter, energy, food, nutrient, decomposer,* and *waste*.

- In Level 5, Module 3, Lesson 12, materials provide instruction for forming groups. Materials instruct teachers to consider each student’s needs and have each group represent a variety of abilities and interests. For example, grouping students with varied English language abilities can support students as they develop language skills.
- In Module 3, Sun, Earth, and Moon System, Lesson 8, materials provide a sidebar note guiding the teacher to introduce the term *solar noon* using a student-friendly explanation. Materials guide teachers to “allow students to use a flashlight and an object such as a pencil to model the effects of solar noon on the appearance of shadows.” In Module 3, Lesson 12, materials provide laser light photographs for students to discuss. Students discuss similarities between the three paths of light. Materials provide the teacher with sentence frames to scaffold student conversations: “I know the light is refracted because…. I think the light is refracted at…because….”

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. For example, the Implementation Guide in English Language Development provides teacher guidance for grouping students who speak the same home language at complementary proficiency levels and can provide additional scaffolding by allowing English learners to converse in their home language, thereby supporting English comprehension and understanding. The Implementation Guide has teachers consider using students’ words when recording questions and related phenomena on the driving question board and when adding labels and explanations to the anchor model. Student language on anchor visuals may include everyday language and students’ home language.
- The Implementation Guide provides a paragraph about Bilingual Program Considerations. Appendices C & E provide Content-Specific Words, General Academic Words, and Spanish Cognates—a list of key terms in the module and their Spanish cognates to support English language development. The material provides a summary in Spanish, links for translation of instructional language, and links to access videos with Spanish dubbing or closed captioning. In Level 5, Module 2, Lesson 1, in the sidenote labeled “English Language Development,” the teacher is given guidance on how to use the Spanish cognates for *organism* (*organismo*) and *interaction* (*interacción*) to develop student knowledge of the terms. The materials also suggest having students brainstorm interactions of two organisms in an environment.

Great Minds PhD Science Grade 5

Indicator 7.4

Materials provide guidance on fostering connections between home and school.

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

Meets | Score 2/2

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

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

Evidence includes but is not limited to:

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

- Materials provide information to share with students and caregivers about the design of the program. Each grade level includes the Family Tip Sheet Overview as a resource, available in English and Spanish, that gives families and caregivers an overview of the PhD Science Texas curriculum and suggests ways to participate in and extend learning outside the classroom. The document provides caregivers with information about Phd Science Texas, what students do in class, what a lesson will look like, how science is connected to other disciplines, how to help students, and what students will study at each level.
- For example, the Level 5, Module 2 Family Tip Sheet includes a lesson overview of Module 2 as well as what students will learn throughout the Module. The lesson overview states, “Your student is discovering how ecosystems work by studying how the plants and animals around a mangrove tree interact.” The Level 5, Module 2 Family Tip Sheet includes a list of some of the classroom activities students may complete, as well as at-home activities and conversation starters for families. Materials state, “Classroom activities for this module include Planning and investigating to determine the source of plant matter. Modeling how matter cycles among plants, animals, decomposers, and the environment. Modeling the flow of energy through an ecosystem.”
- The Family Tip Sheet for Modules 1–3 includes general information about student assessments. The Family Tip Sheet provides information about ongoing and cumulative assessment that allows instruction to be adjusted throughout the module to ensure that students are progressing.

Great Minds PhD Science Grade 5

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

- Materials provide resources and strategies for caregivers to help reinforce student learning and development. For example, in the Family Tip sheet, a section is included that is titled, "How can I help?" This section explains that the Family Tip Sheet outlines the Module Concepts and includes ideas on how caregivers can support the student at home. The Family Tip Sheet also provides suggestions to visit the "National Science Teaching Association's Tips for Busy Parents" website. The Family Tip Sheet includes Conversation Starters and activities that families can use at home. One activity is suggested for families to research different sources of energy used in their homes and community.
- The Level 5, Module 2 Family Tip Sheet includes a list of at-home activities and conversation starters for families. Some conversation starters listed are "Talk about the plants and animals in your community and how they form an ecosystem. Discuss how you use the energy from your food. Work together to trace the energy in your food back to the Sun. Discuss how humans affect the plant and animal life in your community."
- Module 3 provides the following conversation starters: "Discuss how observations of the sky elsewhere compare with observations from your location. Discuss the advantages and disadvantages of exploring outer space."
- Materials provide at-home activities for caregivers to help reinforce student learning and development. Materials provide optional homework for caregivers to help reinforce student learning and development. For example, in Module 1, Lesson 3, students develop models to show how the Sun and the oceans interact to move water through the water cycle. In the optional homework for this lesson, students describe examples of evaporation, condensation, and precipitation.
- Family Tip Sheet, Module 3, provides online resources for caregivers to support understanding of gravity through the use of PhET Simulation, and the website is provided.

Materials include information to guide teacher communications with caregivers.

- Materials include teacher guidance for communicating with caregivers. Materials supply a Family Tip Sheet overview and a Family Tip Sheet for each module for caregivers to understand the PhD Texas instructional materials. The Implementation Guide provides a section for additional teacher resources and includes the Family Tip Sheet (Overview) and Family Tip Sheet (Module). The materials state, "This resource, available in English and Spanish, gives families and caregivers an overview of the PhD Science Texas curriculum and suggests ways to participate in and extend learning outside the classroom." The Implementation Guide mentions that the Family Tip Sheets are provided in English and Spanish.
- Materials provide an optional homework activity with each lesson. The Family Tip Sheet contains a "Is there homework?" section that states the students have informal assignments, including ideas to discuss with adults at home or questions that prompt a simple observation. For example, in Module 1, Lesson 2, the optional homework assignment has "students identify a natural feature close to home or school and create a model that explains how that natural feature may have formed."
- For example, The Family Tip Sheet contains a section titled "How are students assessed?" and materials list the formal tasks of Science Challenges, Engineering Challenges, an End-of Module assessment, and Socratic Seminars in the modules. The materials state, "The balance of ongoing and cumulative assessment allows instruction to be adjusted throughout the module to ensure

that students are progressing," Materials also guide teachers to send home completed assessments and rubrics at the end of each module and spotlight lessons to provide an opportunity to share students' progress.

Great Minds PhD Science Grade 5

Indicator 8.1

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

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

Meets | Score 2/2

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

Materials are accompanied by a TEKS-aligned scope and sequence outlining the order in which knowledge and skills are taught and built in the course materials. Materials provide clear teacher guidance for facilitating student-made connections across core concepts, 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.

- Materials include a cohesive scope and sequence that shows how science knowledge and skills are addressed over the course of the entire year, grades K through Grade 5. The scope and sequence provides pacing information (for each module component) and a summary of the focus standards addressed and assessed in each module of each grade level.
- Materials also include a comprehensive TEKS Content Development Progression document within the implementation guide. The progression document lists each module and spotlight lessons from grades K through grade 5 and correlating TEKS, ELPS, recurring themes and concepts (RTCs), science and engineering practices (SEPs), and scientific concepts that are covered within each module or spotlight lesson. Modules for each grade level also include any other previous grade-level standards that are also spiraled into the module. The progression document clearly shows the order in which knowledge and skills are taught and built in the course materials.
- Each module and spotlight lesson includes a progression of concepts outlined in the Module (or Spotlight Lesson) Map document. For example, in the Earth Processes module, the map lists the anchoring phenomenon, essential questions, and a progressive list of concepts (such as the Earth's water and landforms) with focus questions, such as "What can a desert reveal about Earth's water?" For each concept, phenomenon questions, a bulleted list of student learning with corresponding lessons, and a list of correlating TEKS and ELPS are included.

Great Minds PhD Science Grade 5

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

- The materials provide teacher clarity in understanding how activities and experiences connect concepts and SEPs. Materials include, in each module's appendix, a Module Storyline, written from the student's perspective that describes how students engage with core concepts, practices, and themes as they seek to make sense of phenomena throughout the module. For example, in the Earth Processes Module Storyline, materials provide a detailed progression of how students explore natural processes that change Earth's surface and materials over time using SEPs through the lens of the recurring themes. Within one portion of the Storyline, students read the poem "Earthshake" and discuss how the Washington coast has changed over time. Students read the poem's endnote and learn that the changes to the coast the poem describes were caused by waves weathering and eroding rock over long periods of time. Students wonder about the processes that changed the features they observed in Chihuahuan Desert photographs and how these processes might be similar to the processes that are changing the Washington coast. Students develop models that represent their initial ideas about the processes that have changed the features of the Chihuahuan Desert and then share their ideas with other students. Students notice the ways the models are similar to and different from other models.
- Teachers can use the Prepare section of each lesson set to see how students develop scientific understanding during a lesson set. The Prepare section includes Knowledge Statements and Objectives, which are concise reflections of student actions in advancing their learning during a lesson. They begin with a verb that explains what students will do to build understanding of a sub-component of the Knowledge Statement. For example, in the lessons on mountains and deserts in the Earth Processes module, materials include the Knowledge Statement, "Water from the oceans rises into the air and then returns to Earth's surface as precipitation. Landforms can affect where precipitation falls." Materials include objectives for the lessons, such as students developing models to show how the Sun and the oceans interact to move water through the water cycle, and students explaining how the water cycle and natural features create precipitation in the Great Lakes region.
- Materials include, within the Teacher Guide sidebar, notes explaining how a lesson activity develops students' understanding of content, concepts, and practices throughout the year and across grade levels. For example, in Lesson 11 of the Earth Processes module, the Spotlight note provides teacher clarity in facilitating student connections between the formation of deltas and sand dunes and the ongoing processes of erosion and deposition. After students revisit photographs of mature sand dunes, they Think–Pair–Share to discuss if they think the sand dunes in the photographs will always look the way they do. Materials direct the teacher to tell students that sand dunes are constantly changing and that wind causes them to move, shrink, and grow over many years. The Spotlight sidebar states, "In this lesson set, students model the formation of deltas and sand dunes (5.10C). Students should recognize that erosion and deposition are ongoing processes and that these landforms will continue to change over time (5.5G). Consider reinforcing these ideas by showing students photographs or videos that include examples of deltas and sand dunes changing over time."
- At the end of each module and set of spotlight lessons, students have the opportunity to reflect on RTCs in module learning. Students make connections between their use of RTCs and the concepts learned. Materials provide clear, scripted guidance for teachers to facilitate student-made connections. For example, at the end of the Earth Processes module, students reflect on their use of cause and effect to describe how natural processes change Earth's surface. After

discussing concept statements from the module, such as how energy from the Sun affects weather by moving water from oceans to land in the water cycle, materials direct teachers to ask questions to help students connect recurring themes and ideas, such as How do some of these statements relate to scale, proportion, and quantity? and How do some of these statements relate to cause and effect?

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

- Materials include information about review (including any previous grade-level content) and practice of knowledge and skills throughout lessons in the Pacing Guide. In the horizontal and vertical alignment section in the implementation guide, materials list all module and spotlight lessons in fifth grade and how each continues to spiral throughout lessons during the year. For example, standards covered in Module 1, Earth Changes, are intentionally spiraled into later modules in the grade 5 program.
- Materials regularly allow for students to practice and build on previously taught science knowledge and skills through the use of the Spotlight on Knowledge and Skills. Students have the opportunity to review TEKS taught in previous years before addressing the TEKS for the current school year. For example, matter and its properties are featured in Module 1, Earth Processes, and Module 3, Sun, Earth, and Moon System. The Sun, Earth, and Moon System Lesson has a Spotlight on Knowledge and Skills built on their understanding of how patterns can be analyzed to predict the observable appearance of the Moon from Earth from fourth grade. Students apply this in the lesson as they draw models to represent how the Sun appears to move across the sky.
- In each module, materials provide several checks for understanding tasks to assess knowledge and skills. For example, after a lesson about the water cycle, students develop a model of the water cycle to explain the cause-and-effect relationship between the Sun, the evaporation of ocean water, and the formation of clouds.
- Materials include a student “Science Logbook” that elaborates how a lesson activity develops students’ understanding of content, concepts, and practices throughout the year and across grade levels. For example, at the end of each lesson, students record responses to the questions. In Level 5, Module 3, Lesson 1, students have the opportunity to answer the question “How are celestial objects similar to the landmarks in your directions to the new student? How are they different?” to create an anchor chart using a student-generated list of phenomena that is used throughout the module; students can add to the list any time relevant, related phenomena are suggested.
- Materials identify content standards as Introduced, Addressed, or Mastered in the Standards Addressed table at the beginning of each lesson set. The Introduced label appears in the first lesson set in a level in which students interact with a particular standard. The Addressed label appears in all lesson sets from those lessons that introduce a standard through those lessons that demonstrate mastery of the standard. The Mastered label appears in lessons that assess a standard for the final time, and students demonstrate understanding. Some content standards may be introduced in one module and then addressed and mastered in a later module.

Great Minds PhD Science Grade 5

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 all the criteria for this indicator. Materials include classroom implementation support for teachers and administrators.

The 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 materials include overview documents to support teachers in understanding how to use all materials and resources as intended. For example, a 3–5 Review Walkthrough video provides an introduction to PhD Science and explains each component in the reviewer resources and student resources section. Materials contain an implementation guide with a visual map of the recommended sequence of module implementation with details of concepts and lessons broken down by the standards. Materials provide a curriculum map that includes the module titles, anchor phenomenon, spotlight lessons title, and spotlight lessons anchor phenomenon. A pacing guide, preparation guide, and scope and sequence are explained for teacher ease of use in the Implementation Guide.
- The Teacher Edition provides key terms and Advanced Materials Preparation to prepare teachers for upcoming activities as well as suggestions for additional reading that will support teachers' use of materials. The sidebar found in the Teacher's Edition contains instructional supports to include cross-content connections, differentiation, and teacher notes. Materials contain links to embedded technology in the Teacher's Guide as options for teachers to use to

support student learning. For example, in Level 5, Module 2, Lesson 5, on a sidebar, there is an extension activity to assist learning during learning. The extension activity prompts teachers to ask students to think around this topic "Encourage students interested in the Wawona Tunnel Tree to research the life cycle of a sequoia tree. Ask them to look for information on the time it takes a sequoia tree to become fully grown and the amount of growth that occurs each year."

- The materials are organized in a way that facilitates ease of implementation and use, including assessing and storing materials. Tools to support navigating the resources include a table of contents in each module, tabbed pages to easily identify lessons within the module, and a lesson agenda at the beginning of each lesson to guide the teacher.

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

- The materials include science standards correlations for lessons units, lessons, and activities within the context of the grade level in teacher guidance documents. For example, the Teacher Guide begins each module with a map of the phenomenon, student learning by lesson, TEKS for Science, and ELPS for the module. Science standards are listed in each module, with standards in bold to identify what standard students should master in that module. The material indicates the standards that are being developed in the current module through the use of italicized text. Modules also contain Spotlight Lessons, which also give an overview to describe TEKS and the lessons.
- The materials include cross-content standards for ELA, Math, and Social Studies in sidebar support within the teacher's guide to lessons. Materials also include a Content Area Connection within each module that lists embedded cross-content correlations to English language arts and mathematics standards. Materials include cross-content material within extensions, reminders, and examples for reinforcing reading and writing, calculation, and problem-solving skills as students apply them to science learning. For example, in Module 2, Lesson 3, there is a sidebar that gives guidance on an ELA connection stating, "Acknowledge that students are likely familiar with similes as readers and writers in English language arts, and explain that similes and other figurative language can be useful in science as well. Ask students why science writers might compare a giant sequoia to a football field and school bus rather than simply listing its height and width." In Level 5, Module 2, a social studies content connection is highlighted with an image in the teacher's instructions. Students research the history of tree tunnels in national parks to understand how the National Park Service's priorities have changed over time.

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

- The materials include a comprehensive list of all equipment and supplies located under the section "Instructional Hands-On Materials Kits" as well as within each Module and Spotlight Lessons Prepare section of the Teacher Guide.
- Resources include a list of student and teacher materials required for the lesson or lessons to support instructional activities. Materials offer an Instructional Hands-On Materials Kit (for purchase) for each module that contains all materials needed for modules. Teachers can view a comprehensive list of all equipment and supplies needed to support instructional activities, as well as which supplies are available in the refill kit. Each module provides a list of materials needed before each lesson within the "Prepare" section. The materials list is broken into student materials, teacher materials, and teacher preparation. For example, Level 5: Module 2

Ecosystems Teacher Guide includes a list of student materials, including a science logbook, organism interaction model, and sticky notes. In the same location, there is a list of teacher materials, chart paper, tree photographs, and Mangrove Tree ecosystem organism cards. The bottom of the Materials section contains an Advance Materials Preparation stating that the glacier model will require one day in advance to prepare an ice block.

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

- The materials provide teacher guidance for safety practices and grade-appropriate use of safety equipment during investigations, in accordance with Texas Education Agency Science Safety Standards. The Implementation Guide contains a Safety section with a list of personal protection equipment such as goggles, gloves, and aprons. Materials recommended that teachers design and hang a safety poster in the classroom for students to refer to at any time and refer to the chart when explaining safety expectations before a science activity. Each Module Overview in the Teacher Edition contains a section titled “Safety Considerations.” The materials state, “Safety considerations appear in the Module Overview section of each module, and additional safety notes for teachers appear in lessons. These instructions should be regarded as the minimum safety precautions, and teachers may elect to implement additional precautions.” Some “Safety Considerations” include tips for teachers, such as explaining all safety considerations to students and reviewing all safety expectations before each activity. Students must demonstrate appropriate classroom behavior (e.g., no running, jumping, or pushing) during science investigations.
- The materials provide student guidance for safety practices and grade-appropriate use of safety equipment during investigations, in accordance with Texas Education Agency Science Safety Standards. During the first module of each grade level, students review and sign a Safety Contract and take a Safety Quiz. Materials provide guidance for safety procedures specific to a lesson activity within in-line or sidebar Safety Notes. For example, Module 1 Spotlight Lessons on Physical Properties of Matter, Lesson 2, warns in a box that the activity poses potential hazards. To minimize the risk, students need to wear safety goggles at all times and use extra caution when handling sharp or pointy objects.

Great Minds PhD Science Grade 5

Indicator 8.3

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

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

Meets | Score 2/2

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

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

Evidence includes but is not limited to:

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

- The materials include support for specific scheduling considerations, with guidance for covering required science content for the grade level/course within various schedules. Materials contain an overview providing teachers with considerations for planning instruction at the module and lesson levels. The implementation guide includes pacing information with total instructional days for each module and total days for each lesson. Teacher choice days for review are included in the pacing guide. For example, Level 5, Module 2, should not take more than 43 days to complete.
- The materials include guidance and recommendations on required time for lessons and activities with options for various scheduling considerations. Materials provide each lesson with an agenda that paces out each component of the lesson and how much time the teacher should allot for that component. Each concept lasts from 2–12 days in length, depending on the number of minutes within a science block. Materials contain an agenda for each lesson that provides an expected time for each component of the lesson—the Launch, Learn, and Land portions. For example, Module 3, Lesson 1, allots 10 minutes for Agenda Launch, 31 minutes for the Learn portion divided into the following sub-sections: 12 minutes for Explore Celestial Navigation, 10 minutes for Identify Patterns, nine minutes for Develop a Navigation Model, and four minutes for the final Land portion.

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

- Materials provide guidance for strategic implementation that ensures the sequence of content is taught in an order consistent with the developmental progression of science. Materials

include a suggested sequence of units that considers the interconnections between the development of conceptual understanding and scientific and engineering practices. Materials state, “PhD Science Texas modules are sequenced to build coherent student understanding of science ideas. Each module provides opportunities for students to explore questions and apply knowledge and skills they developed in previous modules.”

- The Curriculum Map provides an at-a-glance view of module titles, anchor phenomena, and Spotlight Lesson titles for each level with color-coded tables that show when students are learning and building upon previously taught concepts. Modules allow students to explore questions and apply knowledge and skills they developed in previous modules. For example, Level 5, Module 1, contains Spotlight Lessons focusing on physical properties. Later in Level 5, Module 3, students are brought back to the concept of physical properties in the Spotlight Lessons on Forces, Motion, and Energy.
- Each module’s Pacing Guide emphasizes applying concepts throughout the school year. For example, in Level 5, Module 3, students must understand the relationship between the Sun, Earth, and Moon and identify patterns of the observable appearance of the Moon from the Earth to demonstrate that Earth rotates on its axis once every 24 hours. In Module 3, Sun, Earth, and Moon System Overview, the materials explain that as students progress through each concept, they develop and refine models of the Sun, the Moon, and stars from the perspectives of both Earth and space. By the end of the module, students use their knowledge of the Earth–Sun–Moon–Stars system to explain the anchoring phenomenon and apply it in a new context. Through these experiences, students begin to develop the enduring understanding that their daily, monthly, and yearly views of the Sun, the Moon, and stars are a result of the movement of the Earth and the Moon in space.

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

- The materials include modules, lessons, and activities for a full year of instruction. Materials outline a full year's worth of instruction which includes 34 weeks of total instruction, including assessments, teacher choice days, spotlight lessons, and challenge days. For example, each module contains 25 to 35 lessons organized into two to four concepts. Materials include a Year at a Glance document that includes recommendations on how to cover all material within the year. The Year at a Glance includes a visual that shows where all three modules fit in a year. Materials state that “to ensure completion of each module, it is recommended to teach science 5 days a week.”
- Materials provide teacher guidance on how to make adjustments to extend or condense units and lessons within the Teacher’s Guide if scheduling allows for additional instruction days or needs to be shortened due to lack of time. The pacing guide provides suggestions to teachers that will help them bridge the gaps for review, assessment, and other instructional support as needed. The Pacing Guide provides options “to allow teachers to maximize instructional time while remaining responsive to students' needs,” but the options do not omit parts of lessons. For example, the Pacing Option Key includes a calendar symbol and denotes a lesson that can be taught in one day or split into two days. Lesson 1 in Level 5, Module 2, Ecosystems, can be taught as follows, “Day 1: Launch through and Read About and Discuss Mangrove Tree Ecosystems” and “Day 2: Explore Organisms Interactions through Land.” The Pacing Option Key also includes Instructional Notes, represented by a clock image. The Instructional Notes “describe time-saving strategies” such as “sentence frames for writing assignments and Teacher Notes that suggest alternative activities.” Extension activities are also provided to extend student learning.

Great Minds PhD Science Grade 5

Indicator 9.1

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

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

- Digital materials include an appropriate amount of white space and an overall design that does not distract from student learning. Appropriately designed student materials support student learning. Teachers can locate important information easily for planning and implementation through the design of the Teacher's Guides.
- The Teacher Editions include a title with subtitles and sidebar information for the teachers. Materials use color-coded boxes with sidebar notes, and embedded instructional supports to easily identify important information. Materials include links within modules for additional reading for teachers. The content is organized with prominent and clear titles and headings, and sections marked with subheadings.

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

- The materials embed age-appropriate pictures and graphics that support student learning and engagement without being visually distracting. Materials embed age-appropriate pictures in the Student Logbook and as Reference Materials throughout each Module.
- For example, Grade 5 materials include a diagram to show the forces acting on a train that is slowing down. The image includes a labeled picture. Grade 5 lesson resources include a picture of a Spring Scale with instructions.

Great Minds PhD Science Grade 5

Materials include digital components that are free of technical errors.

- The materials include digital components that are free of technical errors. Materials are free of spelling, grammar, and punctuation errors. Materials are free of inaccurate content materials or information. Materials are free of wrong answer sheets to problems. For example, Level 5, Module 1, Student Science Logbook, Lesson 17, Activity Guide C, contains accurate content materials and information.
- The Teacher's Edition includes activities that are free of inaccurate content materials or information. The materials are also free of wrong answers to questions being asked. For example, Module 1 provides accurate information about the processes that lead to the formation of sedimentary rocks. The materials are clear of errors in the Student Edition: Science Logbook. For example, the Module 1 Student Edition is free from spelling, grammar, and punctuation errors.

Great Minds PhD Science Grade 5

Indicator 9.2

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

1	Materials integrate digital technology and tools that support student learning and engagement.	Yes
2	Materials integrate digital technology in ways that support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content.	Yes
3	Materials integrate digital technology that provides opportunities for teachers and/or students to collaborate.	No
4	Materials integrate digital technology that is compatible with a variety of learning management systems.	Yes

Not Scored

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 do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. Materials integrate digital technology that is compatible with a variety of learning management systems.

Evidence includes but is not limited to:

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

- The materials integrate digital technology and tools that support student learning and engagement. For example, all components are available on a digital platform. Materials offer a digital platform that provides all components that teachers and students can log in and use at any time. The Implementation guide states that all product components can be found in the Great Minds Digital Platform, stating, "Facilitation slides are available through PhD Science TEKS Edition Projected for each day's lesson." Additionally, "PhD Science TEKS Edition in Sync® offers video lessons and assignments for continuous learning so students can build knowledge if they—or the teacher—have to take time away from class," and "Alt text is available for images on the Great Minds Digital Platform."
- For example, in Level 5, Module 1, Lesson 3, materials provide a link for Google Earth so students can look at the Chihuahuan desert. Students are developing models that show how the Sun and ocean interact. By looking at the images students can make observations about areas with vegetation and areas without vegetation. Students discuss the cause of vegetation occurring prominently near areas that receive more rain. Students then look at maps of rainfall and discuss the location of higher amounts of rainfall. Students are observing, finding evidence, and developing conceptual understanding.

Great Minds PhD Science Grade 5

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

- The materials integrate digital technology in ways that support student engagement with science and engineering practices, recurring themes and concepts, and grade-level content. For example, materials provide links to videos to support student conceptual understanding. Materials use videos throughout the lessons to support student engagement with the science and engineering practices, recurring themes and concepts, and grade-level content.
- For example, in Level 5, Module 1, Lesson 5, materials provide a link to NASA's Center for Climate Simulation Hyperwall Show web page (NASA/Goddard Space Flight Center Scientific Visualization Studio 2010). The video shows the movement of clouds over North America for 20 days. Students watch the video several times and record what they notice and wonder about the movement of clouds. Video links are found in the teacher guides in the lesson outline and sidebar notes for additional academic support.

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

- The materials do not integrate digital technology that provides opportunities for teachers and/or students to collaborate. Materials offer videos for students to review and respond to in their journals and during class discussions. Materials do not offer or provide guidance about utilizing a digital collaboration tools platform for students or teachers to video conference or collaborate online during or outside school hours. The Implementation Guide lists the product components. Materials offer access to most components through the digital platform except Knowledge Deck Posters and Cards. The investigations are not offered through simulations.

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

- Digital materials are accessible and compatible with multiple operating systems and devices. For example, materials offer a PhD Science in Sync platform. Videos and tasks can be assigned to students through this PhD Science In Sync platform. The materials are accessible online through any device with internet access. PhD digital platform is optimized on laptops and desktop computers with a minimum of 1 GB RAM and 2 GHz processor and Broadband internet connection. Materials are fully supported on the last two major versions of the following browsers: Chrome and Safari. Information is found in Help Center Home>Technical Support>General Information>Technical Specifications.

Great Minds PhD Science Grade 5

Indicator 9.3

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

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

- 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. For example, in Level 5, Module 2, Lesson 10, students observe photographs of two different kinds of birds. Students then watch a video of one of the birds, a whooping crane, and wonder why the two birds have different physical and behavioral characteristics. Materials instruct teachers to "display the whooping crane and northern harrier photographs and identify the bird in each photograph. Instruct students to observe the birds. Next, tell students to observe the crane's actions, and then play the whooping crane video."
- In Level 5, Module 3, Lesson 7, students watch the DSCOVR satellite video and wonder about the locations of daytime and nighttime as Earth rotates. Then students build a new Earth-Sun system model to explain that day occurs when Earth completes one full rotation. Students use their observations of the model to make claims about whether it is daytime or nighttime in a city. Finally, students use live camera feeds from world cities to confirm their claims. Materials state, "Return to the video 'One Year on Earth—Seen From 1 Million Miles.' Watch the first minute of the video with no sound, then ask students to Think–Pair–Share in response to the following question."

Great Minds PhD Science Grade 5

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

- Materials provide teacher guidance for the use of embedded technology to support and enhance student learning. For example, in Level 5, Module 1, Lesson 5, in the Teacher Preparation section of the Materials in the Lesson Overview, describes steps teachers can take before the lesson to prepare for the use of embedded technology. The following specific guidance is provided in the body of Lesson 5: "Display Google Earth™. Select the Map Style icon in the sidebar, and then select Clean from the menu that appears to remove borders, labels, places, and roads. Slowly rotate the image of Earth, instructing students to note the amount of land and water they observe. After completely rotating the image, ask students how much of Earth's surface they think is covered by water."
- In Module 2, Lesson 10, a Teacher Note on p.126 describes steps teachers can take before the lesson to prepare for the use of embedded technology, stating, "The video footage is from Aransas National Wildlife Refuge near Austwell, Texas. The whooping crane is the tallest and one of the rarest bird species in North America. The Aransas whooping crane population had dwindled to 18 birds by the late 1930s, but it has slowly increased because of conservation efforts. The Aransas whooping crane population is one of only three populations in the world. To learn more, visit the Texas Parks and Wildlife website about whooping cranes. Visit the Cornell Lab's website to listen to whooping crane calls ."

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

- Materials are available to parents and caregivers to support student engagement with technology and online components. In the Module 2 Family Tip sheet, under the additional resources section, websites are given to support learning about mangroves, stating, "Learn more about mangroves at the website provided. Visit the mangroves in Everglades National Park at the website provided." In the Module 3 Family Tip sheet, under the additional resources section, websites are given to support learning about space simulations, stating, "Explore different activities related to space at the website provided. Explore gravity and orbit simulations at the website provided."