2024 Instructional Material Summer Review Institute

Review Team Appraisal of Title

Grades 6-8 Earth and Space Science

This appraisal form is provided for use by educators responsible for the selection of instructional materials for implementation with districts and charter schools across New Mexico to meet the need of their student populations.

NMPED Adoption Information

Text Title	1-Year Digital License only—Discipline: Earth and Space Science (one per student) Student Digital License (Volume 1–4)	Publisher	Twig Education Inc.
SE ISBN	9798889502449	TE ISBN	9781800846999
SW ISBN	9781800849327	Grade Level/Content	Grades 6-8 Earth and Space Science

Core Instructional Material Designation *(Core Instructional Material is the comprehensive print or digital educational material, including basal material, which constitutes the necessary instructional components of a full academic course of study in those subjects for which the department has adopted content standards and benchmarks.)*

Recommended (90% and above)	☑	**Recommended with Reservations** (80-89%)	☐	**Not Recommended and Not Adopted** (below 80%)	☐

Total Score - *The final score for the materials is averaged between the team of reviewers.*	Average Score
	99%

Cultural and Linguistic Relevance Recognition - *Materials are reviewed for relevant criteria pertaining to the support for teachers and students in the material regarding cultural relevance and the inclusion of a culturally responsive lens. Those materials receiving a score of 90% or above on the CLR portion of the review are recognized as culturally and linguistically relevant.*

		Average Score
CLR Recognized	☑	91%

FOCUS AREA 6: CULTURAL AND LINGUISTIC PERSPECTIVES
Instructional materials represent a variety of cultural and linguistic perspectives.
Statements of appraisal and supporting evidence:

The instructional materials include texts, illustrations, and activities that provide opportunities for students to make connections to real-life experiences. The digital materials provide a section in which students can meet professionals in a STEM area. The materials offer a section titled 'Family Outreach' that includes letters to connect activities extended at home in multiple languages, and which can be edited according to the teacher's needs. Additionally, the materials have available resources in Spanish on a digital platform, teacher editions, student Twig Books, readings, family outreach, videos, handouts, and interactive tools.

FOCUS AREA 7: INCLUSION OF CULTURALLY AND LINGUISTICALLY RESPONSIVE LENS
Instructional materials highlight diversity in culture and language through multiple perspectives.
Statements of appraisal and supporting evidence:

The instructional materials highlight diversity in culture and language and offer examples from different cultures and countries facing similar problems presented in the anchor phenomena. For example, the module "The Heat is On" presents before and after satellite images of how the world is changing and includes examples from China, Peru, Saudi Arabia, Paraguay, and Alaska. Students are directed to observe the differences and record the observations about the causes of these changes. The 'Cultural Connections' section for this module provides scientists' biographies and their climate discoveries.

Science Standards Review - *Materials are reviewed for alignment with the state adopted content standards, benchmarks and performance standards. The science standards include the performance expectations (PEs), disciplinary core ideas (DCIs), science and engineering practices (SEPs), crosscutting concepts (CCCs), and connections (CONNs) of the Next Generation Science Standards (NGSS). They also include the six NM StemReady! science standards.*

Average Score
99%

OVERALL ALIGNMENT
Materials align with the science standards overall.
Statements of appraisal and supporting evidence:

The instructional materials align with the NGSS, NM STEM Ready! standards, and emphasize the three-dimensional practices linked to the performance expectations. The materials offer students opportunities to develop their skills in using claims, evidence, and reasoning to connect previous knowledge to new concepts, ideas, and skills all while fostering a deep understanding of scientific principles. The instructional materials are consistently structured and support students in making sense of their learning through the sections Engage, Explore, Explain, Elaborate, and Evaluate, which are incorporated in each section of every lesson throughout the four modules.

EARTH'S PLACE IN THE UNIVERSE
Materials align to the earth and space science performance expectations (PEs) and related components (DCIs, SEPs, CCCs, CONNs, and NM Standards) for this focus area.
Statements of appraisal and supporting evidence:

The materials align with the earth and space performance expectations. They provide opportunities for students to model the Earth-Sun-Moon system and guide students in understanding cyclic patterns of lunar phases, eclipses, and seasons. The materials also provide the opportunity for students to model and describe the role of gravity and motion within galaxies and solar systems. Students are asked to interpret data to detail the scale properties of objects by modeling eclipses and describing the formation of asteroids and the possible dangers they pose. The materials support students in constructing scientific explanations of the geological timescale and communicating information about various rock layers, relative dating, index fossils, and landscape changes over time.

EARTH'S SYSTEMS
Materials align to the earth and space science performance expectations (PEs) and related components (DCIs, SEPs, CCCs, CONNs, and NM Standards) for this focus area.
Statements of appraisal and supporting evidence:

The instructional materials align with the earth and space science performance expectations. The materials are designed using a '5E Instructional Flow', which includes sections titled Engage, Explore, Explain, Elaborate, and Evaluate. Students are tasked with illustrating the physical and chemical changes that arise with different rock types, including a cycle of energy and matter. The materials offer opportunities for students to create a model detailing the intricacies of rock formation and the movement of matter and energy that accompany them. Students are instructed to utilize their models to create a claim regarding the formation of landscapes.

EARTH AND HUMAN ACTIVITY
Materials align to the earth and space science performance expectations (PEs) and related components (DCIs, SEPs, CCCs, CONNs, and NM Standards) for this focus area.
Statements of appraisal and supporting evidence:

The materials align with the earth and human activity performance expectations. The materials provide opportunities for students to investigate earth's resources and human dependence upon non-renewable resources. They offer opportunities for students to explore problems related to the harvesting and depletion of available resources and the environmental effects of that depletion. They also guide students through an investigation of natural hazards. Students are tasked with developing models to identify and predict the occurrence of possible hazards such as volcanic eruption. Additionally, the materials provide opportunities for students to explore topics related to global warming and consequences of continued global warming.

ENGINEERING DESIGN
Materials align to the engineering design performance expectations (PEs) and related components (DCIs, SEPs, CCCs, CONNs, and NM Standards) for this focus area.
Statements of appraisal and supporting evidence:

The instructional materials align with the engineering design performance expectations. They provide the opportunity for students to develop an engineering solution first by establishing what problem they are focusing on, then by establishing clear constraints and criteria to compare the likelihood of success. The materials also provide students with research opportunities, such as an exploration into fertilizer. Students research how the need for fertilizer arises, what positive impacts it intends to have on agriculture, and the negative impacts that fertilizer can have on climate change by emitting greenhouse gases.

CCSS for ELA and Math in Grades 6-8 NGSS
Materials align to the ELA and math standards identified in grades 6-8 Earth and Space Science NGSS.
Statements of appraisal and supporting evidence:

The materials align with the English language arts and mathematics standards identified in 6-8 NGSS. In the area of English language arts, the materials provide opportunities for students to engage in reading a variety of texts to analyze data, cite evidence, compare and contrast viewpoints, construct arguments, and support claims to convey ideas and information. Students gather evidence from multiple print and digital sources to conduct research projects and develop campaigns on specific issues. The materials also provide opportunities for students to engage with mathematics standards. They task students with analyzing data, defining models with mathematics, graphing results, using variables to represent unknown quantities in an equation, and solving real-life mathematical problems. Students use ratio and proportion to describe relationships between quantities. The materials provide students with the opportunity to investigate a petri dish containing two bacteria cells. They use this to analyze the probability of possible outcomes for the cells, including cell division, cell death, and non-change.

Science Content Review- *Materials are reviewed against relevant criteria pertaining to the support for teachers and students in the specific content area reviewed.*

Average Score
100%

FOCUS AREA 1: PHENOMENA-/PROBLEM-BASED AND THREE-DIMENSIONAL APPROACH
Instructional materials are centered around high quality phenomena and/or problems and require a three dimensional approach to make sense of the phenomena or to solve the problems.

The instructional materials integrate the 3D standards: science and engineering practices, crosscutting concepts, and disciplinary core ideas. Each module includes English language arts and mathematics standards. The introduction of each module includes the anchor phenomena, which is the specific problem to be studied, followed by a general driving question. Each lesson provides a driving question and a wonder question related to the main topic. All of the activities in each lesson include 4 sections: Engage, Explore/Explain, Elaborate and Evaluate. The materials consistently provide students with the opportunity to explore real-world problems in nature, such as the design of a water filtration system to help ensure communities have access to safe and clean drinking water after a natural disaster occurs.

FOCUS AREA 2: THREE-DIMENSIONAL ASSESSMENT
Assessments provide tools, guidance and support for teachers to collect, interpret and act on data about student progress toward the learning goals of the 3 dimensional standards.

The instructional materials offer both print and online 3D assessments. These include pre-assessments, informal assessments, 3D reflections, formative and summative assessments, and benchmark assessments. Assessments also include hands-on investigations and reflection opportunities. Rubrics are provided for both students and teachers.

FOCUS AREA 3: TEACHER SUPPORTS
Materials include opportunities for teachers to effectively plan and utilize materials.

The instructional materials offer resources and support for teachers within each lesson. The digital edition contains additional support materials. Information at the beginning of each unit provides teacher preparation suggestions, a comprehensive list of supplies for instruction and labs, and pacing guides complete with standards alignment. The digital content includes resources for "Professional Learning" to support teacher background knowledge, a "Guide to Scientific Discourse, Language Routines, and Vocabulary", and "Teaching and Research Aids" to ensure teachers are equipped to deliver each lesson. Teacher rubrics are provided within the lessons to help teachers plan and evaluate student progress.

FOCUS AREA 4: STUDENT CENTERED INSTRUCTION
Materials are designed for each student's regular and active participation in science content.

The materials are designed for active student engagement. They provide information about the prior knowledge that students acquired in previous years and the future knowledge that students will achieve in grades 9-12 to help students make sense of their learning. Each of the modules contains "Performance Expectation Progressions" to describe the content of each lesson. The instructional materials include a section titled "Problem Definition, Engineering Design Cycle, and Present". This section defines the problem using visuals, questions, and discussions to ignite intellectual curiosity about the phenomena to be studied.

FOCUS AREA 5: EQUITY
Materials are designed for all learners.

The instructional materials align with the standards for equity, as materials are designed to support all learners through accessible lessons that provide students with multiple ways to build and reflect on science knowledge. Students use a 3D reflection practice, introduced in early lessons, to build and reflect on science knowledge. Students begin each module with 'Wonder Questions' about the anchor phenomenon. As the lessons progress, students reflect on the anchor phenomenon to answer questions and add new 'wonders'. The materials provide opportunities for students to work on investigations and data analysis independently and then work with a partner or large group to share, revise, and test new approaches. Students engage in grade-level appropriate engineering practices. The materials provide suggestions for differentiated instruction in the teacher print and digital editions.

All Content Review - *Materials are reviewed against relevant criteria pertaining to the support for teachers and students in the material regarding the progression of the standards, lesson structure, pacing, assessment, individual learners and cultural relevance.*

Average Score
97%

FOCUS AREA 1 COHERENCE:
Instructional materials are coherent and consistent with the New Mexico Content Standards that all students should study in order to be college- and career-ready.
Statements of appraisal and supporting evidence:

The instructional materials have a consistent and coherent design. They include three-dimensional challenges, which are STEM projects, to guide students to make interdisciplinary connections and apply their scientific concepts, skills, and knowledge to become aware of the world's problems or phenomena. The instructional materials provide consistent opportunities for students to engage in the content using hands-on labs, digital interactives, real-world multimedia field trips, scientific text investigations, and video labs. The materials provide opportunities for students to construct scientific arguments through graphic organizers, the use of rubrics for self-assessment, and opportunities to monitor their performance throughout each module.

FOCUS AREA 2 WELL-DESIGNED LESSONS:
Instructional materials take into account effective lesson structure and pacing.
Statements of appraisal and supporting evidence:

The instructional materials provide lessons that spiral concepts throughout each unit to help students retain and make sense of their learning. The teacher edition presents learning progressions and pacing guides aligned with each anchor phenomenon. Each lesson clearly defines content objectives and identifies what students are expected to know in each of the 3 dimensions of learning. Each unit states the Common Core math and ELA standards alignment and provides rubrics for written responses. Language supports, glossaries, vocabulary lists, charts, videos, interactive labs, and investigations are included throughout.

FOCUS AREA 3 RESOURCES FOR PLANNING:
Instructional materials provide teacher resources to support planning, learning, and understanding of the New Mexico Content Standards.
Statements of appraisal and supporting evidence:

The instructional materials include several resources for teachers to plan, learn, and understand the New Mexico content standards. There is a digital section called 'Professional Learning'. This resource includes different types of charts such as KLEWS (Know, Learning, Evidence, Wonder Questions, and Scientific Words), a Word Map, and claim-evidence-reasoning that teachers can use when delivering a lesson. It also includes graphic organizers and vocabulary supports. The materials also offer a guide to scientific discourse, language routines, and a guide to culturally and linguistically responsive teaching.

FOCUS AREA 4 ASSESSMENT:
Instructional materials offer teachers a variety of assessment resources and tools to collect ongoing data about student progress related to the standards.
Statements of appraisal and supporting evidence:

The instructional materials offer print and online 3D assessments. They include a pre-assessment to identify the misconceptions or preconceptions that students will address in each module. They also include informal assessments like exit tickets to assess students' developing understanding, as well as formative and summative assessments. The materials include an Assessment Platform that contains the Assessment Library, Assessment Center, and Reports to help teachers plan, grade, and analyze student assessments. The Reports tool includes different graphs of student performance data presented as an assessment overview, an assessment report, an item analysis report, a performance report, a progress report, and a class tracker.

FOCUS AREA 5 EXTENSIVE SUPPORT:
Instructional materials give all students extensive opportunities and support to explore key concepts.
Statements of appraisal and supporting evidence:

The instructional materials offer opportunities to explore key concepts for all learners. The materials contain suggestions and strategies for differentiated learning for special needs students, below level learners, above level learners, and English learners. Some lessons offer "Honors and Advanced Extension" options for students to engage with the concepts at a deeper level. Some lessons include a "Cultural Connections" extension, in which students have the opportunity to learn about scientists from a variety of backgrounds. The materials include editable family outreach letters in the introductory resources for each unit to inform families how they can help their student engage with science content outside of school. The materials provide opportunities for open-ended student inquiry that engage students in critical and creative thinking and complex problem-solving.

FOCUS AREA 6 CULTURAL AND LINGUISTIC PERSPECTIVES: **Instructional materials represent a variety of cultural and linguistic perspectives.** *Statements of appraisal and supporting evidence:*
The instructional materials include texts, illustrations, and activities that provide opportunities for students to make connections to real-life experiences. The digital materials provide a section in which students can meet professionals in a STEM area. The materials offer a section titled 'Family Outreach' that includes letters to connect activities extended at home in multiple languages, and which can be edited according to the teacher's needs. Additionally, the materials have available resources in Spanish on a digital platform, teacher editions, student Twig Books, readings, family outreach, videos, handouts, and interactive tools.
FOCUS AREA 7 INCLUSION OF CULTURALLY AND LINGUISTICALLY RESPONSIVE LENS: **Instructional materials highlight diversity in culture and language through multiple perspectives.** *Statements of appraisal and supporting evidence:*
The instructional materials highlight diversity in culture and language and offer examples from different cultures and countries facing similar problems presented in the anchor phenomena. For example, the module "The Heat is On" presents before and after satellite images of how the world is changing and includes examples from China, Peru, Saudi Arabia, Paraguay, and Alaska. Students are directed to observe the differences and record the observations about the causes of these changes. The 'Cultural Connections' section for this module provides scientists' biographies and their climate discoveries.

Reviewers' Professional Summary - *These materials are reviewed by Level II and Level III educators from across New Mexico. The reviewers have brought their knowledge, experience and expertise into the review of these materials. They offer here their individual summary of the material as a whole.*

Reviewer #: 34

Background and experience:

I hold two level III licenses in New Mexico, one for K-8 and one for K-12. I have two master's degrees, one in educational leadership and another in education. I am a teacher with 15 years of experience including teaching science. I have been part of the ISEC Teaching Leadership Team of the Los Alamos Laboratory Foundation for several years and served as the science coordinator for 3 years. I became a review team leader for Spanish language arts instructional materials in 2021 and was a review team leader for career and technical education in finance in 2023. I have been working on standards benchmark scores at my school and district for approximately 6 years. I was part of the curriculum design team in my district in 2018. Currently, I am the lead teacher of my department as a bilingual teacher in the high school.

Professional summary of material:

The instructional materials include the 3 dimensions of the science standards, including several activities to Engage, Explore/Explain, Elaborate, and Evaluate. They implement practical experiments, using real-life tools like barometers, to read the atmospheric pressure. The materials provide opportunities for students to explore, ask questions, research, and report on their learning. They are connected to real-life problems in the world, country, community, and home, focusing on solving problems by designing models. This material challenges students and provides different reinforcements for students with special needs. It is rich in content and provides teachers with the resources necessary to teach each lesson. The instructional materials incorporate many technological resources, including videos, online readings, images and vocabulary cards. The online modality provides a section in which students can meet professionals in a STEM area to guide them in the different ways that the science pathway can be studied. The materials offer several opportunities to connect learning objectives with language objectives. The materials reinforce English language arts by providing several informational texts for a specific topic to guide students to research, plan, script, edit, and share their work. Students are then tasked with making modifications according to their peers' feedback. In the area of mathematics, the materials include extensions that have students solve equations. Lastly, the 'Cultural connections" sidebar gives meaning to the lessons through the exploration of word roots, cognates, and the use of flashcards. All of the content of the instructional materials, videos, reading, and interactive tools are available in Spanish.

Reviewer #: 35

Background and experience:

I am a licensed teacher from the Philippines and hold a level III instructional leader New Mexico license for preK-12 in special education, preK-3 in early childhood and K-8 elementary. I've been teaching in the Philippines for 10 years and this will be my 4th school year as a teacher here in New Mexico. I am a school paper adviser, English coordinator and was one of the writers for 5th grade English modules in my home country during the COVID pandemic. I taught 6th grade ELA and science last school year and at present I am a self-contained teacher working with 3rd grade students.

Professional summary of material:

The instructional material is aligned with the NGSS and the New Mexico STEM Ready! standards. The three-dimensional learning of disciplinary core ideas (DCIs), which covers what students know; science and engineering practices (SEPs--what students do); and the cross cutting concepts (CCCs), on how students think, are all covered by the material through varied lessons and activities. These include digital investigations, reading for evidence and 'think talk'. The materials are aligned with the CCSS both in math and ELA and include leveled reading, writing prompts and reflection, as well as opportunities for listening and speaking through academic discourse and project presentation. Students are exposed to the math standards through student worksheets and handouts. The teacher edition includes the '5E Instructional Flow', which is Engage, Explore, Explain, Elaborate and Elaborate. There are varied assessments in all modules, including formative and summative assessments. Integrated 3D Challenges are also available. These require students to work collaboratively to make cross disciplinary connections and apply what they have learned within the module. Twig Science Middle School is available both in print and digital format and also offered both in English and Spanish. The materials include Family Outreach Letters (FOLs) in the digital materials that can be printed and sent home. The letters summarize the learning content of the driving question and provide parents with suggestions to connect with their student's learning experience outside the classroom. Twig Science is high-quality instructional material that helps teachers plan, teach, assess and ensure that all students have access to grade-level content. The material supports instructional equity for diverse learners.

Reviewer #: 36

Background and experience:

This reviewer holds a Level III instructional license and K-12 administrative license with 22 years teaching experience. Reviewer has experience in vertical curriculum alignment and development of pacing guides to align scope and sequence within instructional time frames. Reviewer has collaborated to develop district level benchmark assessments aligned with standards and materials. This reviewer was involved in the revision, review, and clarification of the New Mexico social studies standards in 2020 and served as review team leader for New Mexico's Summer Review Institute for social studies materials. This reviewer has taught middle school STEM/STEAM classes and actively supported 6th grade science instruction. Currently, this reviewer serves in an administrative role that includes guiding curriculum alignment, grade-level appropriate instruction and assessments, and teacher support.

Professional summary of material:

Twig Science, Earth and Space Sciences, Grade 6 presents well-sequenced science instructional modules that are strongly aligned with the NGSS Performance Expectations and the three dimensional learning of Disciplinary Core Ideas, Science and Engineering Practices, and Crosscutting Concepts. The materials align closely with CCSS for ELA/Literacy through reading (leveled reading available), listening, prescribed writing tasks/prompts, and oral discussion and presentation. The materials are presented in hardcopy and digitally as a 4 volume, 10 module set of materials with an “Anchor Phenomenon” unifying each session to the large lesson and module. Modules, lessons, and sessions are consistent in formatting for both the teacher and student editions. Twig Science includes Spanish texts with benchmark assessments also available in Spanish. The teacher materials provide support for CCSS math standards and deeper connections through available student handouts and worksheets. However, the publisher has limited alignment related to the inclusion of specific New Mexico perspectives. Where applicable, students reflect on their own lives, as in water conservation efforts, and value is given to students' own background, experiences and cultural traditions. Digital resources include guides and handbooks to guide teachers in understanding content, planning for and guiding student learning, lab safety, and supporting and encouraging scientific discourse. Virtual labs and interactive activities serve to engage students in learning through experiences they would not be able to simulate in a regular classroom lab. Each lesson follows a 5E structure and uses the NGSS 3-Dimensional model to ensure standards are addressed in multiple aspects. Lessons include a variety of informational sources--reading, video, charts--for students to reference when writing arguments, claims, and campaigns. Students are encouraged to annotate, take notes, and cite evidence in their presentation modes. A variety of assessments are included, with rubrics and guides for differentiation or remediation. Material is presented in an unbiased, fact-based language and avoids common stereotyping such that teachers can create opportunities to affirm students’ cultures and backgrounds through discussion. The instructional materials include recommendations and activities for learners at different levels, including extension recommendations. Overall, the Twig Science materials are accessible and comprehensively address the NGSS and NM STEM Ready! standards through grade-level appropriate, high quality instructional materials and supports for veteran teachers and those new to science education.