Evaluator: 17 Grade Level:5 Program: FOSS

Washoe County School District K-5 Science
2020 Instructional Materials Evaluation Rubric
(Certified Teaching Professional Form)

Category 1: Designed for Three-Dimensional Learning

Criterion 1A: Phenomena and Problems

Instructional materials focus on students making sense of phenomena or designing solutions to problems which drives student learning.

- Students are engaged with phenomena or problems that can be explained or solved through the application of the three-dimensions.
- A good phenomenon builds on everyday student experiences and targets grade appropriate learning goals.
- Anchoring, investigative and everyday phenomena may be present.
- Engineering lessons require students to use elements of the science core ideas together with elements of core ideas from engineering design to solve problems.

Less of this:	**More** of this:
Phenomena are just for the initial hook.	Phenomena drives the learning.
Phenomena are fun or flashy to engage students.	Phenomena that builds on everyday experiences supports engagement.
Phenomena are brought in after students develop the science ideas so they can apply what they learned.	The development of science ideas is anchored in investigations of phenomena.
Engineering problems are unrelated to the science learning.	Engineering involves designing solutions to problems that arise from phenomena.

Examples of Evidence:

- ◊ Photographs of trash washed up on a beach that leads into a unit on waves in 4th grade physical science unit. (A first-hand experience, video, photograph or data set to start a learning sequence that becomes the "why" for further study grounded in everyday student experiences.)
- ◊ A time lapse video of a badger decomposing is shown to start a life science unit on matter and energy in ecosystems. Students return to the video throughout to explain what is happening.
- ◊ Garbage from the lunchroom is examined to start a unit on matter and how it changes in the 5th grade physical science unit.
- ◊ 3rd grade students explore balloons, aluminum cans, styrofoam beads, and transparent tape to make observations and generate questions about static electricity in the physical science unit, lesson 3.
- ◊ Students address the problem of communicating at a distance without sound following a study of light in the 1st grade physical science unit.

Specific Evidence from Materials
There are 3 units for 5th grade. Each unit consists of investigations. Earth and Sun has 5 investigations. Each investigation has a phenomena that students are observing that can be found on the overview for each investigation. For example: investigation 1 the phenomena is outdoor shadows, investigation 2 it is objects

giving off light and others reflecting light in the sky. The focus questions for each part of an invstigation is directly linked to the phenomena. The students engage in hands-on activities to the focus questions and ultimately understand the phenomena for the investigation. There are guiding focus questions for the investigation (What do shadows tell us about daily patterns involving the Earth/Sun system?) and focus questions that guide the hands-on learning (How does your shadow change during the day?). At the end of the entire investigation you return to the guiding questions. Throughout the investigation students, trace shadows and different times of in a day, they track the sun's path using shadows, they model day and night. These connect to the phenomena of shadows. In investigation 4 out of 5, there is an engineering activity for the students.

To what extent do the materials support Criterion 1A? Include your reasoning.
Click or tap here to enter text.

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Criterion 1B: Integrating the Three-Dimensions

Instructional materials integrate elements of the Science and Engineering Practices, Crosscutting Concepts and Disciplinary Core Ideas.

- Students develop and use multiple grade-appropriate elements of each dimension.
- The dimensions are integrated to work together and are not taught in isolation.
- Learning experiences integrate multiple different pairings of the dimensions to build understanding of the targeted performance expectations.
- Engineering is integrated with at least once per domain of science.

Less of this:	**More** of this:
Students only engage in a single practice element in a lesson.	The lesson helps students use and develop multiple practice elements.
Lessons teach the dimensions separately or only address them at the general level.	Lessons integrate grade-appropriate elements for each dimension.
Engineering lessons focus on trial and error activities that don't require science or engineering knowledge.	Grade-appropriate elements of engineering design and science core ideas are integrated with the other dimensions.
Engineering consists of challenges or step-by-step directions to build something.	Engineering is integrated into the grade-appropriate science core ideas and use explanations of phenomena to design solutions.

Examples of Evidence:

- ◊ 4th grade students conduct an investigation using fair tests in which variables are controlled and the number of trials considered, including collecting measurements and representing data in tables, with balls and ramps to determine cause and effect relationships of speed and energy in unit 2 lesson 4.
- ◊ Students ask questions about waves moving objects and collaboratively investigate how to make different looking waves in water and analyze how these waves affect a floating object in the physical science unit.
- ◊ 3rd grade students generate, test and refine solutions to keep two moving objects from touching each other by applying ideas learned about magnets in lesson 9.
- ◊ With teacher guidance, kindergarten students conduct an investigation with peers to compare the effects of different directions of pushes and pulls on playground balls, student chairs and erasers on different surfaces in the physical science unit, lesson 3.

Specific Evidence from Materials
This program's investigations build on each other. The students conduct hands-on investigations where they gather data, participate in sense-making discussions with classmates and as a whole class. There is a notebook component with organizers to help the students organize the data they have collected during their experiments. There are opportunities in this program for students to design their own investigation and analyze the data that they have gathered. An example of this is the mystery solutions in the Mixtures and Solutions unit. The students design an investigation to find which solution is more concentrated. Throughout the unit and investigations the students are learning the 3 Dimensions simultaneously. The student questions in the lessons use the vocabulary for the Cross Cutting Concepts, Science and Engineering Practices and the Diciplinary Core Ideas. For example: In the Living Systems unit there is a question the

teacher asks the students : “What happens to the system when the top consumers and individual members of other food levels are not eaten?” The CCC, Systems and Systems Models is directlty referenced here. The hands-on investigations identify controlled variables and allow the students to conduct fair tests.

To what extent do the materials support Criterion 1B? Include your reasoning.
Click or tap here to enter text.

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Criterion 1C: Coherence

Instructional materials help students develop increasingly sophisticated understandings within and across grade-levels.

- Lessons fit together to target a set of performance expectations with multiple opportunities for students to revise understandings over time.
- Instructional materials make connections between lessons, units and grade levels.
- Lessons build on students' prior learning in all three dimensions.
- Students engage in learning experiences with explicit connections to other science disciplines and other subjects with intention.

Less of this:	**More** of this:
Lessons are unrelated.	Lessons are presented in a logical sequence to develop understandings.
Lessons build on prior learning but only for the DCIs.	Lessons work together with students' foundational knowledge and practice from prior lessons and grade levels.
Science domains are taught in isolation.	When appropriate, science domains are integrated to show connections.
Other subjects, when included, are not intentionally chosen to support grade-level standards.	Grade-level appropriate standards from ELA, math or other subject areas are integrated with science learning.

Examples of Evidence:

- ◊ In the first unit, students address the physical science standards around the phenomena of garbage and partially address a life science standard related to decomposers. In the second unit on ecosystems, students extend and apply their understanding of decomposers which leads to an engineering problem about materials such as plastics that do not decompose.
- ◊ 5th grade students are investigating water sources around the Earth and make connections to properties of matter in both the physical science and earth science units and prior learning about weather and climate from 3rd grade.
- ◊ 2nd grade students plan and conduct an investigation with water and earth materials as a whole class in one lesson and then in the next lesson students work with a small group to plan and conduct another investigation with wind and earth materials to further learning of core ideas and practices.
- ◊ Students apply ELA learning to write a set of directions for conducting an investigation in the earth science unit, lesson 6.
- ◊ Students use line plots to analyze climate data in grade 3, unit 4.

Specific Evidence from Materials
In the Mixtures and Solutions unit the students are taught about concrete examples of a mixtures and moves on to the particle level which is more abstract. They explore gravel and water, powder and water and salt water. The unit moves on to what a salt solution looks like on a particle level and adds in concentration, saturation and chemical reactions. The Living Systems unit starts with a system and then breaks up the lessons into the subsystems in a food web. In this unit the idea of transfer of energy is referred to in each lesson. In each of the 3 units air is discussed. Earth and Space discussing what air is and the atmosphere. Living Systems talks about how air is a key component in photosynthesis and

part of the life cycles. In Mixture and Solutions air is discussed on a particle level as a mixture. The ELA and Math standards are incorporated in all lessons. They use math to determine salt still exists in a solution and the more mass, the more salt added. They gather data using tables and graph their data. Reading standards are used in lessons where the students are reading about the science (cause and effect, key idea and details). The students are writing daily.

To what extent do the materials support Criterion 1C? Include your reasoning.
Click or tap here to enter text.

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Category 2: Instructional Supports

Criterion 2A: Assessing the Three-Dimensions

Instructional materials support monitoring student progress in all three dimensions.

- Multiple and varied assessments allow students to demonstrate learning in all three dimensions including application of knowledge in performance tasks.
- Formative assessments, including teacher, self and peer assessments, are embedded throughout to inform instruction.
- Assessments are unbiased and elicit direct, observable evidence from all students.
- A phenomena or problem drives tasks, and information from the task is required to complete it.
- Rubrics and scoring guidelines are provided for interpreting student performance including sample student responses

Less of this:	**More** of this:
Checks for understanding elicit only a few student responses or rely primarily on group projects.	Individual student artifacts are used to measure student understanding of each dimension.
Only summative assessments that measure the end point of understanding are provided.	Formative assessments provide feedback to adjust instruction and inform students of their progress.
Assessments are primarily rote memorization of facts and terminology.	Assessments reflect application of all three dimensions including tasks that are driven by phenomena or problems.
Only multiple-choice tests are given.	Multiple measures and types of assessment are used throughout.

Examples of Evidence:

- ◊ As students are engaged in a performance task in unit 3, lesson 2, there are indicators for teachers to look for and information about possible responses. This information is embedded in the lesson.
- ◊ In unit 1, there are two performance assessments, peer feedback throughout, exits slips, a summative assessment, and a prewrite.
- ◊ Individual student learning is assessed using written work that answers the driving question of the unit. (Earth Science, p. 76)

Specific Evidence from Materials
There are unit tests that can be found in an on-line version and paper version. After each investigation there are I-checks. There are response sheets that students complete after they have been taught a few parts to an investigation (paper form only). The assessments required students to answer real world scenarios with the knowledge they have gained. For example: "Some avoidance behaviors need to be experienced only once by humans. For example, a young child touches a burning birthday candle. After that experience, she knows not to do it again. Explain how a human's sensory system responds the first time a burning candle is touched and then how that human knows not to touch it again." This is an assessment question for the Living Systems Unit test. In each lesson there are expected answers for student questions to aid the teacher. Ex: *What evidence will tell us that the seeds have become active?* [They will start to grow.] The

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Focus Questions start a lesson and end with the students answering the question, and sharing their answers with other students to help them reflect on their learning. The student notebooks and graphic organizers are student artifacts that help teachers assess their students understanding of a lesson. The I-checks and unit tests consist of written responses, multiple choice and student modeling.There are performance checklists for teachers to use during hands-on investigations that help the teacher assess their students progress in certain cross cutting concepts, science and engineering practices and the disciplinar core idea.

To what extent do the materials support Criterion 2A? Include your reasoning.
Click or tap here to enter text.

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Criterion 2B: Instructional Experiences

Instructional materials support equitable access to science knowledge and practice for all students.

- Students engage with direct (preferably first-hand), shared experiences that are relevant and authentic, serve as the basis for learning and meet the developmental needs of elementary students.
- Students' questions, prior experiences and diverse backgrounds related to the phenomenon or problem drive learning.
- Materials provide an opportunity to learn by allowing for the development of scientific understandings over time using multiple modalities.
- Materials provide opportunities for students to make connections to and explore the natural world outside the classroom.

Less of this:	**More** of this:
The lesson focuses on a topic that some students have experienced.	Direct experiences in the classroom provide access and equity for all students.
Student questions and prior experiences are not connected to the learning.	Materials provide supports for connecting students' own questions to the targeted learning.
Students read about what others have done.	Students learn through concrete experiences.
Only one or two modalities are used.	Multiple modalities are used throughout each instructional segment.

Examples of Evidence:

- ◊ Students develop physical models of a landfill as open and closed systems to observe during the 5th grade garbage unit.
- ◊ Students identify components of garbage disposal in their homes and communities which connects the phenomena that started the unit.
- ◊ Students conduct a first-hand investigation of erosion and deposition using a stream table, observe time-lapse videos of landslides, engage in a virtual investigation, read accounts of earth changes by wind and record changes to the playground after a snow event in the 4th grade earth science unit.
- ◊ Students raise trout from eggs in the classroom and make observations over time as part of their study of traits in the life science unit.

Specific Evidence from Materials
Students engage in hands-on activities first and then read or watch videos about what they experienced first hand. In the Earth and Space unit the students build a scale model of the Earth and moon. They work out the math to find how many centimeters apart the moon should be from the Earth. They then read about the Earth and Moon, watch videos about them and then answer the focus question which is tied to the phenomena for this invstigation. There are virtual tutorials and investigations on FOSSweb for the students to play. The textbook is on the website. It is interactive with text-to-speech and embedded links and videos. There are outdoor activities in each unit. Some units have more than others. Ex: Students go outside and find a tree. They attach a bag to a tree limb. They return to this limb at different times to observe the bag. They then measure how much water is in the bag. In Earth and Space the students go outside to trace their own

shadows and track the sun. They go out multiple times to observe the shadows and measures their length and note the time of day.

To what extent do the materials support Criterion 2B? Include your reasoning.
Click or tap here to enter text.

Criterion 2C: Student Sense-making

Instructional materials support equitable access to science knowledge and practice for all students.

- Materials support student sense-making at both an individual and group level.
- Classroom discourse focuses on expressing and clarifying student reasoning with opportunities for students to share ideas and feedback with each other that supports the iterative and collaborative co-construction of explanations.
- Materials include supports for oral and written language processing to involve students in scientific discourse for sense-making including a language-in-use approach.

Less of this:	**More** of this:
The teacher tells students what they need to know.	Students figure out explanations through classroom discourse with each other.
The teacher calls on a few students to share reasoning.	All students have the opportunity to share their thinking orally or in writing.
The focus is only on getting the "right" answer.	Sense-making begins with initial student ideas that progress in sophistication.
Vocabulary is front-loaded. All students are provided with sentence frames.	Specialized vocabulary is embedded in the instructional sequence with multiple opportunities to use and development over time. Writing supports are differentiated.

Examples of Evidence:

- ◊ 5th grade students develop models of how scents travel that are refined over the course of a three weeks using a combination of visual and written language providing multiple opportunities to develop precise vocabulary in the physical science unit.
- ◊ 3rd grade students answer questions in their notebook individually using pictures and words to explain their initial ideas about how static electricity works and have the opportunity to revise this after discussing with a peer and the whole class in the physical science unit.
- ◊ The teacher facilitates a class discussion using a word wall where kindergarten students share observations with a shoulder partner and the whole group about the kinds of things in their homes to figure out that the things we need come from nature.
- ◊ Suggested sentence frames are included to support oral and written responses when needed with the goal of independence.

Specific Evidence from Materials
There is a student notebook for each unit. In the notebook students gather data, draw models, answer focus questions and fill in graphic organizers for the readings. In the 5th grade Living Systems unit the students grow wheat grass in the light and dark. They measure growth daily. After a few weeks of observing they write their final observations, participate in a sense-making discussion with classmates and then as a whole class. They then write a claim, evidence and reasoning answer to the focus question. This program uses academic vocabulary and scientific vocabulary in the questioning of students. It requires the students to use this language in their answers and writing. Most lessons start with a quick student discussion about the topic. In the Mixtures and Solutions unit the

investigation about salt concentration, it starts with review questions for students to discuss and share out. Through out the lessons students are engaging in argumentation from evidence and discussing their thinking. Sentence frames are offered for those who need them.

To what extent do the materials support Criterion 2C? Include your reasoning.
Click or tap here to enter text.

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Criterion 2D: Teacher Supports

Instructional materials support teacher planning and instruction.

- Materials include background knowledge in both science content and pedagogy and student preconceptions.
- Materials have clear and concise instructional directions and connections to the standards.
- Materials provide guidance to support differentiated instruction, extra support and extensions at the appropriate level for a broad range of learners.
- Materials include professional learning and additional instructional planning resources.
- Materials have supports for families to extend learning and offers suggestions for how to help their student(s) at home.

Examples of Evidence:

- ◊ Information prior to lessons gives teachers things to except that students may already know in unit 1 p.12 in addition to how their understandings will build.
- ◊ 1st grade students have a choice to investigate different variables related to shadows, and suggestions are included as well as extensions to do at home. (Light unit, p. 40)
- ◊ The assessments include recommendations for additional supports when students don't meet expectations. "Students may struggle to articulate that scientists look back at the data they collect to look for patterns and to draw conclusions about phenomena. One way to support them in this thinking might be to share an anecdote such as, "When I was growing up, my mom used to measure my height by marking it on the wall in the pantry. When I look back at those marks, I notice patterns, like that I grew faster between the ages of 5 and 8 than I did when I was older."" (p.14)
- ◊ Students make observations of the sky with their families, looking for patterns over time. Families are provided with background information on how to record observations and what patterns to expect.

Specific Evidence from Materials
At the beginning of each unit's teacher manual is background knowledge sections that discusses the science knowledge needed to teach the unit. This is on-line as well, it is in the interactive einvestigation guide under the Framework link. Through out the lesson each step is laid out with what the teachers should ask, students answers, what to look for in their notebooks, step by step instructions for guiding the hands-on activities, and a list of all materials that will be needed for the lesson. There are strategies provided for EL learners such as sentence frames. There are many opportunities for the students to draw out their thinking. Interdisciplinary Extensions are offered at the end of each investigation. There is a homenote to families for the units. In Mixtures and Solutions investigation 3 the homenote has a putty recipe for the families to make together to support the concept of concentration. There are teacher prep videos to help teachers see how an experiment is suppose to be set up. On FOSS web teachers can find contact information for the FOSS program, including professional development information. Found in the Overview link of the einvestigation guide under FOSS contacts. All of the notebook masters are in a reference book for teachers and on-line. The tests can be found on-line with a coding guide for teachers. The coding guides have rubrics which help teachers decide how to grade the written responses and each item shows a link to the 3 Dimensions for that item question.

The assessments can be taken on-line as well. There are performance task checklists for teachers. On-line the teachers can print off posters for the lessons, word wall cards(English and Spanish), materials pictures, and safety posters. There are also teaching slides the teachers can use while teaching the lesson.

To what extent do the materials support Criterion 2D? Include your reasoning.
Click or tap here to enter text.

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Category 3: Student Materials

Criterion 3A: Program Design
Instructional materials represent a comprehensive K-5 core program.

- Materials provide instruction that correlates to our recommended instructional minutes for science.
- Materials are available in both English and Spanish.
- Graphic organizers and templates for science notebooks are included.
- Teacher and student materials have resources both in print and online.
- Multimedia supports are included such as videos, tutorials and simulations and when appropriate reflect the diversity of our students and society in a culturally responsive manner including different genders and sexual orientations, from many cultures and nations, both contemporary and historical.
- Technology options are appropriate for both classroom and home use possibly including translation capabilities.

Examples of Evidence:

◊ There are four units, each representing nine weeks of instruction at 180 minutes a week. This is short of our recommended minutes of 240 minutes a week for 5th grade.

◊ There are 132 60-min lessons for the whole year. This correlates to our recommended instructional minutes of 220 minutes per week for grades K-2. (3-4 60-min lessons per week)

Specific Evidence from Materials
FOSS units exceed the districts 240 instructional minutes a week. The lessons are expected to be taught everyday for an hour. The textbooks, teacher masters and homenotes are available in Spanish. The videos are not. The textbooks are on-line and paper for teachers and students. There are videos, tutorials, and virtual investigatons for the students. The teacher masters have all of the notebook graphic organizers for each lesson. There was some diversity in the textbook when it came to the readings about scientists and some images of children. The word wall vocabulary cards are in Spanish and English.

To what extent do the materials support Criterion 3A? Include your reasoning.
Click or tap here to enter text.

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Criterion 3B: Science Equipment

Instructional materials include hands-on materials and equipment that support three-dimensional learning.

- Enough materials are included to allow students to do the investigations themselves.
- Materials are of a quality that will last through many uses.
- Materials include the tools necessary to make observations and measurements and conduct investigations.

Examples of Evidence:

- ◊ There are enough thermometers, graduated cylinders, balances, magnifying glasses and measuring tapes for a whole class to use in small groups.
- ◊ Everything is included to engage in the lessons except for things that would already be found in the classroom like tape and colored pencils.

Specific Evidence from Materials
There are enough materials for 8 groups of 4 students. There would not be enough for individual students to complete a lab alone. There are enough scales, cylinders, pipets, thermometers, measuring tapes for the groups to use. The materials could be used multiple times, except for the living organisms cards. Almost all of the materials are supplied, even sticky notes. The teachers supply paper towels, goggles, gluesticks, and some food items.

To what extent do the materials support Criterion 3B? Include your reasoning.
Click or tap here to enter text.

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Criterion 3C: Reading Materials

Instructional materials include grade-appropriate texts that support three-dimensional learning.

- A range of text types and genres, both print and online, are embedded in learning experiences.
- Texts support context-specific academic vocabulary.
- Materials reflect the diversity of our students and society in a culturally responsive manner including different genders and sexual orientations, from many cultures and nations, both contemporary and historical.
- Materials include supports for reading comprehension for a variety of student needs including high-quality questions.

Examples of Evidence:

- ◊ Texts include an interview of Sylvia Earle and profiles of Chien Shiung Wu and Benjamin Banneker. These highlight the connections to the science students are learning. Pictures of scientists working in the field represent the diversity of our students.
- ◊ Cultural myths about the sun and stars are included in the earth/space science unit.
- ◊ Vocabulary is highlighted in the reading that follows a concrete experience where the vocabulary is first introduced.

Specific Evidence from Materials
The textbook is available in Spanish and English. It is on-line and printed. The interactive ebook has text-to-speech capabilities. There are little videos and links embedded in the interactive book. There are no other reading materials besides the textbook. The vocabulary is highlighted in the textbook. There are some stories about scientists in the field. There was a few scientists of ethnicity. There are reading graphic orgainzers given to scaffold student learning. The book on-line can be accessed in interactive, pdf, and audiobook format.

To what extent do the materials support Criterion 1A? Include your reasoning.
Click or tap here to enter text.

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Referenced, adapted and formatted from the following documents:

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Washoe County School District Needs Evaluation

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