Evaluator: 61 Grade Level:5th 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
Living Systems I1: The intro materials have a phenom listed, but it does not transfer well to the student work. "The school cafeteria wants to reduce the trash from lunch. Food scraps and some paper will go into the compost bum for the school vbegetable garden. Although this says it is an anchor phenom, it is really more of an engineering design challenge type of thing. A phenom would be more

like – Students notice trash bins are filling up in the lunch room – from there lines of investigation to collect the science would be established that would allow students to determine how to address the problem.

There is not really a phenom. There is a guiding question but that starts the investigation, but it does not meet the level or rigor of a phenom. Nor is it super engaging for students at a personal level.

What is a system?
Is Planet Earth a system? – these questions do not connect student questioning or wondering and sense-making like a phenom would but instead establish the goal of finding an answer to the question rather than engaging in sense-making

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

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
Part 4 – redworm investigation – gets to the

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

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
LS 32– The structure of the investigations build upone each other, and the integration of multiple DCIs into a unit is great, this helps to show the connectedness of the science disciplines rather than teaching them in isolation.

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

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
LS I1: Answer the guiding question – How can you identify a system? This is not aligned to the 3Ds and is a basic vocab question. This was done prior to any investigation or sense-making. LS lists the DCI with associated guiding questions that students should be able to answer Pg 132 What to look for and assess progress have the assessment built into the investigation.The assessment has a checklist that points out the use of the practices explicitly and the look fors have statements about what the students

should be doing to show they are using whatever practice is listed “students organize observations in some way. (Analyzing and interpreting data).”

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

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
LS I1: The whole part 1 of the first investigation is about the word system and although defining the word and all its attributes is important, that process of developing knowledge is not aligned to the NGSS or framework. It is not phenom based, and the process does not serve to develop sense-making in students. Students should be developing their understanding of sense-making of systems through investigations, not just defining it. LS Iv.1/2 page108students read and watch a video about systems on Earth then make a food web using cards and arrows to illustrate what eats what.

Page 110 students begin organizing organism cards into a food chain and describe why they used that arrangement.

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:

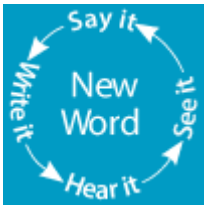
- ◊ 5th grade students develop models of how scents travel that are refined over the course of a three weeks using a combination of visual and written language providing multiple opportunities to develop precise vocabulary in the physical science unit.
- ◊ 3rd grade students answer questions in their 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
Students discuss with a partner the answer to the question "How can you identify a system?" The question values an answer over the process of using discussion as a sense-making process. Multiple points in the investigations the teacher asks a question only to then answer it. Ask,

Which organisms in this food chain do not eat any other organisms? [The grass.]

How can grass survive without eating? [Grasses are plants. Plants make their own food by using energy from the Sun.]

Tell students,



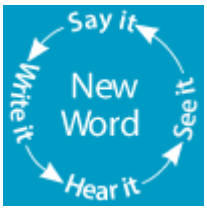
Organisms that make food are ***producers****. Producers transfer* ***energy*** *from the Sun to make the food that is used in the ecosystem. Producers need sunlight, water, and carbon dioxide to make food. Plants,* ***algae****, and other organisms that make their own food are the primary source of matter and energy entering most food chains. In a food chain, energy of food moves from one organism to the next.*

Tell students,

Producers such as grass, pine trees, berry plants, and algae make their own food. Animals in the ecosystem don't make their own food.

How do animals get their food? [They eat other organisms.]

Tell students,



Organisms that eat other organisms are ***consumers****. Consumers depend on other organisms for food. The matter and energy from the other organisms are transferred to the consumer. Animals that eat plants are called* ***herbivores****. Animals that eat other animals are called* ***carnivores****. Animals that eat plants and animals are called* ***omnivores****.*

Ask students to find cards that are consumers in the woods ecosystem. Make a list of some of those on the board under the heading “Consumers.”

18. Describe a food web

Summarize by telling students that if you record all the feeding relationships in an ecosystem, drawings get much more complicated than a straight–line food chain. If you want to show three different animals eating the grass, and more than one organism eating each of them, then you are drawing a **food web**. Add the term to the word wall.
Show students how to use arrows to indicate which organisms use other organisms for food. Arrows point from the organism that is eaten to the organism that eats it.

19. Distribute paper strips

The questions tend to be DOK1 (LS 110) Which organism in this food chaid do not each any other organism? How can grass surgive without eating? These require students to listen to what the teacher said during the investigation, and not what they found themselves through investigating.

Show students the paper strips. There are about 14 strips for each group. Students can draw arrows on the strips with a marking pen and use the arrows to connect the organisms in a food web. If they want to make a shorter arrow, they can cut the strip in half and draw a shorter arrow. The arrows will show the feeding interactions in the ecosystem. You might give an example of how to use the arrows to show connections.

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20. Practice making food webs

Challenge each group to make one grand food web that includes at least 12 organisms in the woods ecosystem. Allow 15 minutes for the groups to make their food webs.

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
There are a lot of teacher supports on the home page. However, the access within the virtual site is a little clunky and feels more like a pdf than an interactive teacher guide The PDF is exactly like the physical copy, and has the teacher information for supports, extensions, information about the standards alignment and progression of the lessons Each investigation has extensive teacher background knowledge Each investigation has step-by-step directions and questions, making everything easy for the teacher

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
Links to Clever – bonus to only have to use one platform for student access Resource links are in google Drive – will that be an issue? Many of the virtual resources are provided in both Eng and Span. The resources on FOSSweb are mostly just PDFs of the physical manual and don't provide any transformative digital resources or access. It would be nice if there were an editable version (such as the parent home note) The interactive investigation guide feels clunky and poorly put together. The guide does link to PDF resources such as the student reader or letter to the family. The website is not dynamic and feels old. The site is not responsive (in terms of it's ability to be used on different devices such as tablet vs phone vs computer). May not be an issue but something to consider. Videos are embedded within the web platform so no need to access from a different website. There are extension activities for home use, which helps bridge the gap between school and home.

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
Materials are what you would expect. They are easy to replace if needed and few need to be purchased right from the distributer. The investigations allow for some substitutes which is nice if you run out of something.

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

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
LS: The text is available digitally as a PDF and as an interactive HTML, and as a physical book. The digital HTML provides audio for many of the reading sections as well as some video clips of images. I wish the interactive version provided accessibility options such as adjusting the text size or background color, but it really is just the PDF with some play over video and audio options.

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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