Washoe County School District K-5 Science
2020 Instructional Materials Evaluation Rubric
(Community Members, Administrators and Families 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.

- A good phenomenon builds on everyday student experiences and targets grade appropriate learning goals.
- Engineering design solutions are tied to grade specific science ideas.

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 bucket of water is physically explored by students and leads to exploration of properties of matter in 2nd grade.
- ◊ 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
The anchoring phenomenon: Sometimes ponds are filled with water. Other times they are icy. Students explore this by observing properties of matter, analyzing how a liquid takes the shape of a container, comparing solids and liquids. They discuss Bridges. Each lesson begins with a brief "Observing Phenomena" section. It includes a question, a short video, and a connection to real life experiences. Lesson 2: Slide 3- Notice how ice melts in water glass. Students are asked what questions they have about the phenomena.

To what extent do the materials support Criterion 1A? Include your reasoning.
High Extent: The greater unit phenomena is relevant and engaging, Each lesson has a phenomena built into the lesson that supports the unit level

Criterion 1B: Integrating the Three-Dimensions

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

- Students are doing science as scientists would to explain the natural and human-built world.
- Materials use an inquiry-based and problem-solving approach where students engage in the practices of science and engineering.
- Science and engineering are not presented in a linear manner; they are messy.

Examples of Evidence:

- ◊ Students conduct an investigation, including collecting data, with balls and ramps to determine cause and effect relationships of speed and energy in unit 2 lesson 4.
- ◊ Students investigate how to make different looking waves in water and how these waves affect a floating object in the 4th grade 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.

Specific Evidence from Materials
Students are engaging in real life phenomena. Students conduct an investigation to describe and classify different materials in Lesson 1. Scientists also look for patterns and order when observing the world. By lesson 3 they are planning and conducting an investigation with liquids in containers. Mathematics concepts cross cut as they are using standard units of measure. -Students build bridges in Lesson 3 with different materials. They evaluate the bridges to assess cause and effect relationships, and they analyze data from testing the materials used to build the bridges. - In Lesson 4, students are directed to go to a station and look carefully at a design in the photo. Then they use materials to copy the design exactly.

To what extent do the materials support Criterion 1B? Include your reasoning.
Medium to High extent: Students get to have access to science by conducting experiments themselves. They collect data and tie in measurements of volume. Students engage in the design process with the bridges. I am critical of the direction for lesson 4, copying a design exactly has less value than creating their own.

Criterion 1C: Coherence

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

- Materials make connections between lessons, units and grade levels.
- Students engage in learning experiences with explicit connections to other science disciplines and other subjects with intention.

Examples of Evidence:

- ◊ 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.
- ◊ Students apply ELA learning to write a set of directions for conducting an investigation in the earth science unit, lesson 6.
- ◊ Line plots are used to analyze data in unit 4 at the 3rd grade level.

Specific Evidence from Materials
-Lessons contain a "Learning Progressions" section, describing what was previously learned in prior lessons, and what is coming up. This demonstrates coherence across lessons and grade levels (TM pg 151) "In a previous 2nd grade lesson students observed materials and described their properties." In 5th grade students make observations and measurements to ID materials based on their properties." -Students are applying mathematics skills in measurements and data. They record how many 2 oz paper cups of water each container holds. They use a pictograph/bar graph to record the data. (TM pg 157, 158) -Students apply ELA writing skills by making a claim and supporting it with evidence for the investigation. (TM 161)

To what extent do the materials support Criterion 1C? Include your reasoning.
Medium to high extent: Lessons aligned to the standards, therefore are coherent, as the standards are coherent. Each lesson builds on the previous lesson. The lessons are minimal. There may be missed opportunities.

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.

Examples of Evidence:

◊ As students are engaged in a performance task, there are indicators for teachers to look for and information about possible responses and next steps. 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
Assessments include Formative assessments: ex: a lesson game online students answer selected response questions about the lesson. Students record their "claim, evidence, and reasoning" in written form using an online journal. Lesson 4 online has a 5 question test. To include 2 short answer responses -There is a performance assessment (TM page 212) Students use materials to engineer an umbrella. They write about if their plan and design worked and if they would change anything. They describe which material they chose for each part of the umbrella and why they chose it. A performance assessment rubric is available for teachers to assess student's response.

To what extent do the materials support Criterion 2A? Include your reasoning.
Medium extent: The benefit of the online assessment options is great for distance learning, however, in person lessons would lend themselves to assessing in a more authentic way. Student conversations and student interactions with the investigations would provide more appropriate anecdotal data. The umbrella assessment is limiting. A wider variety of objects to create one would push students more, and reveal more of their thinking.

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.

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 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
Lesson 1: students are able to explore with tin foil, pipe cleaners, clay, paper, sponges. They collaboratively try to describe the properties, sort and classify the materials. Lesson 2: students explore with containers. They get to measure how many 2 ounce cups a container will hold. They get to freeze a cup of water. They discuss the differences between solids and liquids Lesson 3: Students use different materials (6) to build a model bridge. They test it's waterproof abilities. They determine what materials are best for building bridges. Lesson 4: Students copy designs from a model using blocks. Then they get to create their own "extreme" design. In all lessons students observe media/videos of the phenomena and they have discussions.

To what extent do the materials support Criterion 2B? Include your reasoning.
Medium to High extent: The provided instructional opportuninities are engaging. Students interact with hands on inquiry. The unit is brief. 3-4 weeks worth of instructional opportunities. This is minimal.

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.

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 a magnet 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
In the lessons many high level questions are asked. “How is the shape of the chimney different than the shaped of the walkway?” Questions are asked throughout. (p. 182) It is not stated specifically strategies for conversations. Teachers would need to bring this pedagogical knowledge to the table. There are opportunities for students to reflect on their learning, using sliding scale “Still learning….Know it” lines. (student book p. 24). Students record their “sorting work” into pre made tables in their book (p. 26).

To what extent do the materials support Criterion 2C? Include your reasoning.
Low to Medium extent: Although the questions are there, teachers would need to bring lots of knowledge to the table to get students discussing the science and learning. These supports are not built in. The reflection activities on the scale seem basic and glossy, rather than carry substance.

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 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
The TM has a Unit Overview (p. 125) that reviews the lesson objectives, storyline and phenomena. There is unit video the teacher can watch. A paragraph titled "What to Know: describes advanced prep. Each lesson has the Performance Expectations, Lesson Phenomnea, Disciplinary Core Idea, Cross cutting concept, and science and engineering practice identified. Another book resource "Review Guide" Provides relevant information to "wrap your brain around" the unit and lessons. There is a "teacher helper"' section that gives lesson supports. "have students writie cause and effect statementst explaining that plants must have water and sunlight to grow." (p. 24) Many sections throughout say "See online for extensions." (p. 38) Such as under the headings Sharing Results, Planning Another Investigation. The text print in the teacher books is small and hard to read. It does not feel teacher friendly. Sending teachers to the online resources when they are clearly looking in the book for a reason is frustrating.

To what extent do the materials support Criterion 2D? Include your reasoning.
Medium Extent: What is available is appropriate and helpful. It is not teacher friendly and accessible.

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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
There are three Units: Each Unit has 6-8 Lessons. Each Lesson Lesson 1: Master lesson is 107 mins: Fast track Lesson is 44 mins. Lesson 2 is expected to take 67 mins. However the “Fast Track” lesson option identifies the parts of the lesson that could be cut out to make a 34 min lesson. Lesson 3: Master Lesson 92 mins. Fast Track 59. Overall- the unit has between 279-537 mins worth of instruction which translates to approximately 3-4 weeks worth instruction at 3 60 mins blocks of time per week. -Instructional materials exist in English and Spanish. Online assessments are in English and Spanish -Pictures in the Notebook and Stimulations represent students of color (pg 58) Students with different color of hair, students of Asian decent (28). Although it can be hard to tell, my students of mostly Hispanic descent would not necessarily see themselves represented in the text easily identified.

To what extent do the materials support Criterion 3A? Include your reasoning.
Low extent: There is not enough substance and material to equal our expected instructional opportunities. My students may find it challenging to “see themselves” in the 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 2 bins of materials. One for common materials and one that contains materials specific for each unit. Each material bag is labeled clearly with the lesson number and title and needed materials list with labels that also direct teachers to gather certain materials from the common bin. There are enough materials for 6 small groups. (12 petri dishes, 6 plastic bins, 12 paper cylinder rolls etc.) Although materials can be used in many different ways, students are being exposed to very little “hands on equipment”. A variety and abundance of experiences and opportunities to explore with different things has value.

To what extent do the materials support Criterion 3B? Include your reasoning.
Low extent: There are not opportunities for students to work with materials on an individual basis. They will always have to work in groups. The materials are organized well and easy to find….but there is so few of them. Students will have had repeated exposure to the same materials. I see this could become boring. They could use more exposure to more things, this creates schema!

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
-Picture placard cards (1 8x12 size laminated) provide picture supports of materials. -Students individual notebooks/ Science Journals are sturdy and colorful with space for students to record their learning. -There are brief informational text articles in the notebook (Student book pg 27) Text with notes (space to annotate) “Measuring Liquids and Solids” -There are no printed texts or books -Online there are 2 leveled text options. Level A (on grade level) Level B (2 levels below grade level)

To what extent do the materials support Criterion 1A? Include your reasoning.
Low Extent: Supplemental readings support teachers to connect content in multiple ways. There is limited availability with this. Teachers would have to look elsewhere for this.

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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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