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
Driving question: How do sound and light interact with objects. Students develop an understanding of how to observ and manipulate the phenomena of sound and light. Exploration with light and sound connect to how sound/light travels from a source to a receiver. Explore how to use these sources to communicate information and compare the ways animals use ears and eyes to gather information about their environment. Students look for vibrations at the sound source and come up with words to describe different sounds (Inv 1) Students develop a model to explain the phenomenon of sound traveling from a source to a receiver. (Inv 2) Students explore the phenomenon of light travel by positioning mirrors to reflect images so they can see their own eyes and view objects behind them (Inv 3)

To what extent do the materials support Criterion 1A? Include your reasoning.
Investigations provide firsthand experiences. The investigations are activity focused allowing students to be scientists and engineers before they use other sources such as text or video. The science journal requires critical thinking and writing with its more open ended format.

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 practice sound discrimination by listening to the sounds that objects make when they are dropped. (Inv 1, part 2) After the investigation students answer the focus question in their notebooks. (inv 1 page 108) Students share responses with a partner. (page 111) Student go outside to do investigations as well as those in the classroom p.113 Sense making discussion support students in understanding their findings. P 115 Science and Engineering Practices, Disciplinary Core Ideas, and Cross cutting concepts appear on page 1 of each investigation.

To what extent do the materials support Criterion 1B? Include your reasoning.
Students always engage in investigations before reading or discussion. Very inquiry-based instruction.

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
We have learned that sound comes from things that are vibrating. Let's see if we can find out more about sound and how to change sounds. Inv 2, page 135 Ask students where they have heard the term volume before. Inv 2, page 135 Use a reading comprehension strategy. Page 139 Interdisciplinary extensions for math, art, music, science are included. Page 166 Teaching note: This is a good time to review tha opaque objects make shadows. Page 219

To what extent do the materials support Criterion 1C? Include your reasoning.
These materials really support learning science across content areas; we are not only science teachers but continue to be ELA and math teachers during these investigations.

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
Investigation 3: Embedded assessments: science notebook entry, performance assessment. Benchmark assessment Sense making discussions – informal assessment/ check for understanding at its best! Performance Assessment Checklist/what to look for

To what extent do the materials support Criterion 2A? Include your reasoning.
All assessment practices are related to checking students understanding of the phenomenon under investigation. Assessment notes help the teacher understand how students may be constructing their understanding and/or misconceptions. The assessment practices are seamlessly included in the lesson planning and are not an after thought.

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
There is a conceptual flow outlined for teachers in each investigation – supports how students gather their knowledge for the guiding questions. Page 215 Students use mirrors and flashlights (common objects) to discover how we can redirect a light beam. Page 219 Reading (p 229) support hands on investigations. Videos support learning (p 233) An engineering challenge is included (page 246)

To what extent do the materials support Criterion 2B? Include your reasoning.
Varied materials support student understanding of science objectives. Only program to take the students outside the classroom often to perform investigations.

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
Generate a list of student questions page 228 Answer the focus question page 228 Share observations page 227 Wrap-up/Warm up share notebook entries page 223 Discuss the student questions, discuss the guiding question page 201 Have a sense making discussion page 198

To what extent do the materials support Criterion 2C? Include your reasoning.
Multiple opportunities to engage in discourse before having to show understanding. So many collaborative conversations will enhance the experience for not just EL learners but all learners.

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
Background for teacher page 208-211 Teaching children about light and mirrors page 212-215 Guiding the Investigation. Page 219 Teaching notes support instruction page 220 Home/School Connection page 252 Grade level planning guide page B16 Teacher support videos Interactive whiteboard resourcesm

To what extent do the materials support Criterion 2D? Include your reasoning.
Extensive materials to support the novice and veteran science teachers; especially with the background and teaching children sections!

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
Material kits are for no more than 32 students in a class. There is a materials list for teacher supplied materials; not all are readily available. Materials/Equipment list easily read. FOSSWeb is the internet access to FOSS digital resources. Ebook can be projected and inteactive. Media library Class pages with notes and assignments

To what extent do the materials support Criterion 3A? Include your reasoning.
Very comprehensive

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 for 32 students Teachers also need to supply materials

To what extent do the materials support Criterion 3B? Include your reasoning.
Concern with teacher supplied materials

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
Science resource book has informational text supporting ideas in each investigation Reading comprehension strategies included in teacher resources

To what extent do the materials support Criterion 1A? Include your reasoning.
Appropriate for first graders

Referenced, adapted and formatted from the following documents:

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Achieve, Inc. (2017). Primary Evaluation of Essential Criteria (PEEC) for Next Generation Science Standards Instructional Materials Design.

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BSCS (2017). Guidelines for the Evaluation of Instructional Materials in Science.

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MacDonald et al. (2020). *Design Principles for Engaging Multilingual Learners in Three-Dimensional Science* Wisconsin Center for Education Research (WCER) Working Paper No. 2020-1. https://wcer.wisc.edu/docs/working-papers/WCER_Working_Paper_No_2020_1.pdf

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Washoe County School District Needs Evaluation

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