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
Unit 1 Anchoring phenomenon: The food coloring from Good Food Production, Inc., is exactly the same as Red Dye #75. Chapter-level Anchor Phenomenon: Good Food Production, Inc.'s food coloring separated into different dyes.

To what extent do the materials support Criterion 1A? Include your reasoning.
The units have an anchoring phenomenon that students build understanding of through studying phenomenon in each lesson. For those phenomenon that students may not have first hand experience with they are given a chance to experience it for themselves. For example, in the Modeling Matter Unit students use chromatography to learn about food dye which is part of the anchoring phenomenon (see above).

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 conduct a chromatography experiment which includes SEPs (planning and carrying out investigations, analyzing and interpreting data, engaging in argument from evidence, and obtaining, evaluating, and communicating information), DCI (PS1.A: structure and properties of matter), and CCs (scale, proportion, and quantity, cause and effect, and patterns). –Modeling Matter, Chapter 1, lesson 1.2

To what extent do the materials support Criterion 1B? Include your reasoning.
All three dimensions are integrated within the unit. For example, in Modeling Matter, Chapter 1, lesson 1.2 “Students investigate various mixtures of food substances in order to identify similarities and differences in mixtures and classify mixtures based on their properties (e.g., thickness, color) (patterns).” The investigation is the Science and Engineering Practice students are using to demonstrate their understanding of the Disciplinary Core Idea: measurements of a variety of properties can be used to identify materials. The Crosscutting Concepts are a little less obvious but students will need to use scale, proportion, and quantity to perform their experiments that will demonstrate cause and effects as well as patterns.

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
Prior knowledge (preconceptions) are provided for the unit. In Modeling Matter they read "Students are likely to have encountered the idea that matter is made up of particles that are too small to see individually. Students will also likely recognize that there exist different materials that have different characteristics. While neither of these ideas…" Connections of PEs across units example from Modeling Matter, Standards and Goals section of the unit guide- "Students also focus on the disciplinary core ideas represented in this Performance Expectation in the Amplify Science Ecosystem Restoration and The Earth System units."

To what extent do the materials support Criterion 1C? Include your reasoning.
Within a unit each lesson builds upon student understanding. Connections between units were not explicitly stated or I was unable to locate them. Connections to previous grade level understandings were stated as preconceptions (see above) and connections across units were listed in the Standards and Goals section (see above) as were the connections from previous grades and future grades. There is a clear ELA influence as students are aske dot make connections, check for understanding, write, etc. in their investigation notebooks. The Common Core ELA & Math standards are listed. The math connection was less apparent without having done the experiments.

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
P.58 of the Teacher's Guide "Let students know that they will have another chance at the end of the unit to write similar explanations in greater detail and that it will be an interesting opportunity for them to see how much they have learned!"

To what extent do the materials support Criterion 2A? Include your reasoning.
Pre-assessments are not graded but rather for students to see how much they have grown (see above). Students explain their understanding prior to the start of the lesson and then expand on their understand at the end of the unit. Students receive a different investigation book for each unit to record their ideas, experiment results, and understanding.

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
Student-facing Technology- "In the grade 5 Modeling Matter unit, students use the Modeling Matter Simulation to explore why certain substances form mixtures and other substances do not by observing molecular attraction and repulsion and the effect of introducing emulsifiers into a mixture." Modeling Matter, Chapter 3, 3.7 "To conclude the unit, students instruct the teacher in how to make the salad dressing, reviewing what they have learned along the way."

To what extent do the materials support Criterion 2B? Include your reasoning.
Students are asked to use technology as part of the units but not independently at home. Videos are used to support in class learning. These can be downloaded in case of internet connection issues. As students move through the unit they build on their understanding of the anchoring phenomenon. They begin with explaining the anchoring phenomenon in their own words, then they explore lesson phenomenon to build their understanding, and at the end of the unit they reexplain their understanding of the anchoring phenomenon (see above).

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
p. 4 of The Earth System: Investigating Water Shortages asks students to connect ideas from the water encyclopedia and pages of Water Shortages, Water Solutions and come up with a new understanding that answers the question: “How can people affect how much freshwater is available?”

To what extent do the materials support Criterion 2C? Include your reasoning.
Students are provided with opportunities for discussion as well as writing prompts. Students are asked to digest information from different books to develop understanding (see above).

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
Teacher's Guide p.49 "Specific Differentiation Strategies for Students Who Need More Support" & "Students who need more challenge" this includes students with disabilities. In the Unit Overview p.2 of Teacher Guide teachers are provided with background information, the why, the how, a unit map, progression including prior knowledge, how to prepare to teach the units, a list of materials including where to find them, what unit they are used for and how many are in the kit or needed.

To what extent do the materials support Criterion 2D? Include your reasoning.
Teacher's Guides include background information, instructional suggestions for the teacher, differentiation, and rubrics. Spanish language supports are provided if the additional license for Spanish versions of the documents is purchased. The explanation of differentiation is not very detailed. The section regarding students with IEPs just suggests following a student's IEP. It is possible there are more detailed supports in other units but I did not see them. Teacher preparation is provided in extreme detail including how to set up a science wall, what materials need to be printed, where materials can be found, and if they will be needed for the next lesson. These instructions include estimated prep time that teachers will need to prepare for each piece of the lesson.

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 4 units total. Within each unit there are 2 dedicated assessment days and 20-24 60-minute lessons.

To what extent do the materials support Criterion 3A? Include your reasoning.
There are roughly 2-3 60-minute lessons per week not including assessment days.

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
p.15 Teacher Guide The Earth System "chart paper, cool, dark-colored paper, glass cups, hand lenses, ice cubes, light-colored paper, markers, etc."

To what extent do the materials support Criterion 3B? Include your reasoning.
Everything is provided in the teacher kits for a class of 36 students twice (some materials are reusable so there is only 1 per kit, ex. Earth Ball) except materials that could be found in a classroom or household. I would be nice if they were included. Some items can be purchased in the "Amplify Science Starter Kit" but that is a separate purchase

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
Each unit includes 5 unique student books written by Lawrence Hall of Science

To what extent do the materials support Criterion 1A? Include your reasoning.
The literacy components include; read-alouds, shared reading and partner reading. Students are also provided with a unit encyclopedia to use to gather information. There is a mix of informational texts for each unit. Students use these texts to build their understanding.

Referenced, adapted and formatted from the following documents:

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Achieve, Inc. (2018). Science Task Prescreen.

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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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NGSS Lead States (2013). *Next Generation Science Standards: For States, By States.* Washington, DC: The National Academies Press.

Nolan, C. (2015). *Getting their hands dirty: Engaging learners in authentic science practices outside the classroom* (Practice Brief No. 20). STEM Teaching Tools.

Washoe County School District Needs Evaluation

Washoe County School District. (2020). Request for Instructional Material Submission RFP 2020A.