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
Students explore a phenomena of how materials solids and liquid materials are similar and different. They start this phenomena by examining solids such as a wire, a popsicle stick, a bag with water, and a bag with air. They discuss and describe the properties. They then move to focusing just on solids, where they construct towers, and then begin exploring how solid objects can be human-made and occur in the natural world. This is followed by an investigation on liquids (2), Bits and Pieces (beans, rice, cornmeal) in Investigation 3, to end with them exploring interactions between solids and liquids and water (4). Students physically interact, hold, observe, sort, construct, sift through mesh screens, pour and mix different matter. They constantly discuss and record observations and learnings in their notebook.

To what extent do the materials support Criterion 1A? Include your reasoning.
High Extent: Students consistently explore to grapple with the phenomena that all the stuff in our world is made up of different things and that the material it's made from makes it useful to us in different ways.

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 investigations using models to compare similarities and differences. They do this with objects, solids, liquids. The build towers and bridges using their gained knowledge of material properties. -Students explore patterns by grouping objects based on shared properties, this displays patters in structure and function -Students come to understnad that different properties are suited to different purposes which makes it possible for them to engineer successful structures. (PS1.A). Ex: They discover that rigid properties like a popsicle stick are better for building bridges or towers than flexible properties. – -Students discuss with their partners during “sense making” discussions and they record data, observations, reflections in their Science Notebook.

To what extent do the materials support Criterion 1B? Include your reasoning.
High extent: Students engaging in the science content explore cross cutting concepts through each investigation. They must utilize and develop many skills in order to think through the investigations and record their learning.

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
-Scope and sequence Map of units across the grade levels shows connections from topic to topic. For example students explore solids and liquids in 2nd grade, then focus on Mixtures and solutions in 5th grade. -The unit begins with an exploration of matter, followed by investigations specifically on liquids, solids, solids made up of small pieces (like corn meal), and a final investigation on the effect of mixing materials with water. -Interdisciplinary extensions are provided: Math problems: Sorting a “trailmix” of materials and creating a graph. Art extension: Use 15 Bean soup mix for students to create a collage. Engineering Extensions: Students use magnets to separate mixtures.

To what extent do the materials support Criterion 1C? Include your reasoning.
High extent: The nature of the NGSS themselves are coherent. This curriculum is aligned to the NGSS. The lessons build upon each other and students use the previous learnings to grapple with new thinkings. The grade level connections allow students to develop schema for lessons and units they will come across in the future grade levels. Units help support other units. For example, the Solids and Liquids unit supports the Landforms unit, as students will have background knowledge about what things are made of when they dive into learning what our Earth is made of.

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
-Formative Assessment opportunities happen throughout the investigations. The student notebook is a source to gather assessment data. Investigation 1 part 2, students insert a notebook entry “Object Materials sheet” and “Properties of Solid Objects” sheet. Guidance in the TM helps teachers define what they are looking for (“Students are able to correctly mark the intersections that relate to properties and materials.) -Performance Assessments: A checklist in Investigation 1, Part 3, guides teachers to identify which students are able to: Plan and carry out investigations, Construct Explanations, Structure and properties of matter, Patterns. It provides a space for teacher to write brief notes or collect anecdotal information -Benchmark Assessments- Ex: 1. Draw a line from the property word to the picture of the liquid. 2. Cup of liquid next to two containers. Pour the liquid what will it look like? -Sample student responses and answer keys

To what extent do the materials support Criterion 2A? Include your reasoning.
High Extent: Teachers are given many suggestions to assess student understanding, in a variety of ways. The provided rubrics support teachers in having a “common formative assessment.” Students are asked to show their learning in meaningful ways.

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
Students begin engaging in observations and hands on in the very first lesson. Students explore a variety of objects and record describing words to describe properties of the objects. Students begin writing in their student notebooks and record the observations. Lesson 1: They each get their own set of four obects (fabric square, plastic rectangle, plastic tube and wood cylinder) They describe them. Later they are give three new objects (craft stick, screw, wire) They observe how they are the same or different. As lessons go on they get to use their knowledge of material properties and engineer a tower and bridge. Time is spent developing new vocabulary to describe what they are observing. Students use a science notebook to write their discoveries in. They glue in questions and have as much space as needed to record their learning.

To what extent do the materials support Criterion 2B? Include your reasoning.
High Extent: Students are engaged in science in an inquiry based approach during every lesson. Students have many opportunities to explore with different materials and have hands on experiences in many ways. The amount of materials allows for students to explore individually giving each child equitable access.

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
-Students engaged in group discussions and individual observation records. Students discuss the properties of objects in small groups in lesson 1. -Vocabulary words are introduced just in time during discussions, then added to the word wall. -Students pair up to share their observations in their science notebook. -Student texts are included to read about the content. Titles include, “Everything Matters” “Towers” “Liquids” “Pouring”-

To what extent do the materials support Criterion 2C? Include your reasoning.
High Extent: Many opportunities are provided for students to engage in the hands on inquiry on an individual basis, however, they are still in groups. This fills the need for each child to be able to have equitable and sufficient opportunities to “do the science” and it fills the need for kids to be able to talk about it. Explicit vocabulary instruction takes place in the discussions (ex: properties) then students engage in conversations to practice making sense of properties.

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
-How to and Informational videos available online to include things like Teacher Prep videos for each Investigation and part of the lesson. The videos walk through the set up and objectives of each part. -Built in classroom management techniques in the lesson, "The Getter" job. A student assigned to get the materials for each member of their group. -Professional Development videos titled "Sense-Making Discussions," "Access and Equity," "Cross Cutting Concepts," "Science Notebooks" are available for teachers to learn about key parts of science instruction. The videos show real life teaching examples, with student discussions and teacher's questioning to model. -Materials include Home/School Connection Resources including a family letter, and a home science activity that connects classroom experiences. -Teachers can set up a "Class Page" online where families and students can access things online, allowing for students to have access to private eBooks, and take online assessments. -There are online activities: ex: The Falling Bottle Puzzle. Students put pictures of bottles holding a substance in order to show what happens to a a liquid as the bottle falls over. It includes an animation. (Inv. 2 Part 3) -Quality Background for the Teacher information available for each investigation. It provides enough information to build teacher content knowledge. Ex: Can two or more objects have the same property? It shares how classification, assigning objects to categories have hierarchial relationships.

To what extent do the materials support Criterion 2D? Include your reasoning.
High extent: There are an abundance of resources. Everything a teacher could need to be successful is here. The teacher prep videos, the ready made student materials, and instructional resources such as the lesson slides. There is much opportunity for a teacher to learn and develop their own knowledge with the added resources on equity, teacher background knowledge for lessons..etc

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
Online Teacher Resources include Notebook Masters, Teacher Masters, and Assessment Masters, for Print in English and Spanish. Word Wall cards, Poster Sets, Equipment Photo Cards, Student eBooks, Streaming Videos, Teaching Slides, and Vocabulary are in English and Spanish -Science Notebook printables and examples are available including templates and focus questions. -There are online activities: ex: The Falling Bottle Puzzle. Students put pictures of bottles holding a substance in order to show what happens to a a liquid as the bottle falls over. It includes an animation. (Inv. 2 Part 3) -This Unit is approximately 9 weeks worth of instruction with at least3 lessons per week. There are 3 units for 2nd grade.

To what extent do the materials support Criterion 3A? Include your reasoning.
High Extent: Having enough student materials for individual or small groups for investigations is huge. The instructional materials provide enough to meet the instructional minutes dedicated to science per week.

Criterion 3B: Science Equipment

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

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

Examples of Evidence:

◊ There are enough thermometers, graduated cylinders, balances, magnifying glasses and measuring tapes for a whole class to use in small groups.

◊ Everything is included to engage in the lessons except for things that would already be found in the classroom like tape and colored pencils.

Specific Evidence from Materials
-There are enough materials for students to individually, in pairs, or in group settings, conduct experiments themselves. This includes thinkgs from card decks (enough for 24 students), to plastic bottles, carboard pieces, screen sets (15 total), craft sticks and wood cylinders. -Print materials like picture/information card sets include enough for 8-10 groups worth. -Decent quality materials. -A large variety of materials that are used across three different units provided students with hands on learning with a plethora of material experiences.

To what extent do the materials support Criterion 3B? Include your reasoning.
High extent: It is important students have access to high quality materials in volume. There would be limited sharing expected. Whole classes could engage in learning without feeling like they are "watching others do science." The same materials aren't used over and over again in every unit….meaning they will last longer and students get exposure to more items.

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
-A big book for each unit -Text book with hard back cover. Includes vibrant pictures -Print and on-line materials available -A variety of student genders, skin types are represented in the text book reading material (page 94 is representative of students in my school).

To what extent do the materials support Criterion 1A? Include your reasoning.
-Medium extent: It is definitely not lacking. The high quality text book will last for years and is engaging. The big books are a plus. The only thing lacking would be leveled texts. Teachers would have to supplement this using other resources

Referenced, adapted and formatted from the following documents:

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Washoe County School District Needs Evaluation

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