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
Each unit has an anchoring phenomenon (make connections with the world around them), lesson phenomenon (investigative phenomenon that is used to pique students' interest and drive instruction), and a local phenomenon (students

build a deeper, personal connection to the phenomenon through direct observation- using Try it!, See it!, and Research it!)
Unit 1- Plants and Animals: anchoring phenomenon- beavers change land and water.
Unit 2- Pushes and Pulls: anchoring phenomenon- you move in many different ways on the playground.
Unit 3- Weather: anochoring phenomenon- weather is not the same everywhere.

To what extent do the materials support Criterion 1A? Include your reasoning.
The materials support Criterion 1A because phenomena drives the learning for each unit (Plants and Animals, Pushes and Pulls, and Weather). In each unit, phenomena builds on everyday experiences and supports engagement in each lesson.

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
Plants and Animals unit: each lesson has 1 performance expectations, 2-4 science and engineering practices, 1-3 crosscutting concepts, and 1-2 disciplinary core ideas. Each lesson builds upon the previous lesson. For example, in lesson 2, students take a virtual tour of an animal shelter and look for patterns in what different pets need. They use this information to help them decide what kide of animal would make an appropriate classroom pet. After that, they build on their conclusions from their investigation by reading about they things animals need to live and grow. Pushes and Pulls unit: each lesson has 1-2 perfomance expectations, 1-5 science and engineering practices, 1-3 crosscutting cnocepts, and 1-4 disciplinary core ideas. Each lesson builds upon the previous lesson. For example, in lesson 3, students play a game of pushing a ball in different directions and start and stop

the ball from moving. Then they use arrows to show how the ball moves. After that, they predict and then test how the ball will move when pushed in different directions. Weather unit: each lesson has 1-4 performance expectations, 1-4 science and engineering practices, 2-3 crosscutting concepts, and 1-3 disciplinary core ideas. Each lesson build upon the previous lesson. For example, in lesson 5, students read about different kinds of storms and their causes. Then, they write a story about a storm they have experienced by interviewing their family about the storm and then sharing their story with the class.

To what extent do the materials support Criterion 1B? Include your reasoning.
The materials support Criterion 1B because the lessons help students use and develop multiple practice elements. The lessons also incorporate grade-approriate elements for each dimension. Each unit has grade-approriate elements of engineering design and science cor ideas that are integrates with the other dimensions.

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
In lesson 1 of the Plants and Animals unit, Kindergarten students investigate patterns about plant needs and ask questions based on observations to find more information. By the end of the lesson, they understand that plants need water and light to live and grow. In 5th grade, students will learn that plants get the material they need for growth chiefly from air and water. In lesson 3 of the Pushes and Pulls unit, Kindergarten students learn how a push or pull affects the direction of an object's motion. They practice using pushes and pulls to affect a ball's speed and direction. They also note the effect on a ball when they push it away or pull it toward them. In 3rd grade, students will learn that

pushes and pulls are forces and that those forces have strength and direction. They will also plan and conduct and investigation to provide evidence for the effect of balanced and unbalanced motion on the motion of an object. In lesson 5 of the Weather unit, Kindergarten students learn about different kinds of storms and their causes. After that, they write a story about a storm they have experienced. In 3rd and 4th grades, students will learn that a variety of natural hazards result from their natural processes. They also will learn that humans cannot eliminate natural hazards, but they can take steps to reduce their impacts.

To what extent do the materials support Criterion 1C? Include your reasoning.
The materials support Criterion 1C because the lessons are presented in a logical sequence to develop understandings. The lessons also work together with students' foundational knowledge and practice from prior lessons and grade levels.

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
Unit 1 has a performance assessment after lesson 4 (making a place for animals to live) and a performance assessment at the end of the unit (keeping the park clean). Unit 2 has a performance assessment at the end of the unit (making a marble playground). Unit 3 has a performance assessment after lesson 4 (keeping cool at the park) and a performance assessment at the end of the unit (planning for storms). Performance assessments allow students to work collaboratively or individually, hands-on opportunities, and have analytical rubrics for teachers and students. Formative assessments include a lesson game, simulations, journaling, and making sense of phenomena.

Lesson level assessments include answer keys and rubrics for all necessary questions. The assessments online come in both English and Spanish.

To what extent do the materials support Criterion 2A? Include your reasoning.
The materials support Criterion 2A because individual artifacts are used to measure student understanding of each dimension. The formative assessments provide feed back to adjust instruction and inform students of their progress. The assessments also reflect application of all three dimensions including tasks that are driven by phenomena or problems.

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
The posters for each unit represent diverse learners. Each lesson has a blended learning option for students. In lesson 1 of the Plants and Animals unit, students build background knowledge by talking about if they have plants at home and how much water the plants get. Then, they dicscuss if they have been to a garden or farm, what plants they saw, and how the plants get water. This is connecting to their lived experiences. In lesson 4 of the Pushes and Pulls unit, students conduct a first-hand investigation of what happens when they push a chip so it bumps into a tube tower and altering how they push the chip. At the end of the lesson, they make sense of the phenomenon.

To what extent do the materials support Criterion 2B? Include your reasoning.
The materials support Criterion 2B because they allow for direct experiences in the classroom that provide access and equity for all students. The materials provide supports for connecting students' own questions to the targeted learning. The students also participate in concrete experiences throughout the units. In addition, multiple modalities are used throughout each instructional segment.

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
In lesson one of the Plants and Animals unit, students use their science journals to collect data about plants at a garden center. After that, they compare plant needs by discussing with a partner. At the end of the lesson, students show what they know by filling in blanks with pictures of words and write a claim about what plants need to survive using evidence and reasoning. In lesson three of the Pushes and Pulls unit, students begin by observing a phenomenon of balls getting kicked straight and sideways and writing any questions they have. Then, they play a game with the whole class by keeping a ball moving and recording in their science journal where the ball moved. After that, students explore vocabulary words: forward, backward, up, and down. Next,

studens show what they know by writing or telling how a boy's train will move. At the end of the lesson, students write about their findings of how they change the direction of a ball as they kick it by making a claim, using evidence and reasoning.
In lesson four of the Weather unit, students work with a partner to build a shade maker to keep the sand cool in the sun. In order to do this, they must agree on the materials to use and how to build it. They draw their design first, and then build it. The students use their science journals to circle what tools and materials they used. Throughout the lesson, students discuss what things could help make shade. At the end of the lesson, students write a claim for how shade keeps people cool using evidence and reasoning.

To what extent do the materials support Criterion 2C? Include your reasoning.
The materials support Criterion 2C because students figure out explanations through classroom discourse with each other, students have the opportunity to share their thinking orally or in writing, and sense-making begins with initial student ideas that progress in sophistication.

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
Each lesson gives teachers the learning progression of what students learned in previous lessons and what they should be able to do at the end of the lesson. The lessons also include performance expectations and 3D learning. Science background is included for teachers that includes science concepts, vocabulary, investigation,and student text. Each lesson has a differentiation section that includes modifications for English Learners, students with special needs, and advanced learners. Each lesson has an enhancing learning section to expand the lessons with outside resources.

To what extent do the materials support Criterion 2D? Include your reasoning.
The materials support Criterion 2D because they include background knowledge in both sciene content and pedagogy and student preconceptions. The materials have clear and concise instructional directions and connections to the standards. The materials also procide guidance to support differentiated instruction, extra support and extensions at the appropriate level for a broad rance of learners.

Evaluator: 13 Grade Level: Kindergarten Program: TCI- Bring Science Alive

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
The Plants and Animals unit has 7 lessons and 2 performance assessments. Each lesson is 120-145 minutes long. The Pushes and Pulls unit has 5 lessons and 1 performance assessment. Eash lesson is 85-145 minutes long. The Weather unit has 6 lessons and 2 performance assessments. Each lesson is 100-170 minutes long. The pacing guide recommends that you may need 1-3 days per lesson for independent student work time including reading the student text, completing the interactive student notebooks, playing the lesson games, and completing the assessment. Phenomena are presented through videos, images, and hands-on observations with rich multimedia throughout to provide easy ways for students to interpret the phenomena. Students are provided with science journals for each unit. The journals correlate with each lesson. The journals come in both English and Spanish. The journals are also colorful and engaging to look at. Each unit has placards that are used throughout the lessons.

To what extent do the materials support Criterion 3A? Include your reasoning.
The materials support Criterion 3A because they provide instruction that correlates to our recommended instructional minutes for science (180 minutes a week), materials are available in

both English and Spanish, graphic organizers and templates for student notebooks are included, and teacher and student materials have resources both in print and online. Multimedia supports are also included that reflect the diversity of our students and society in a culturally responsive manner.

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
Material kits are prepared and organized to seamlessly integrate into each lesson; everything needed for one lesson is grouped together into a clearly labeled bag. Consumable materials can be ordered online. Common materials that will be used are in one box, and the unit materials are in another box. The unit materials are bagged together according to their unit and lesson. These bags are also labeled with what materials are inside and what materials are needed from the common materials box. The amount of materials look as if there will only be enough for one year. Unit 1, lesson 7, there are 35 balloons. Unit 2, lesson 2, 15 cardboard boxes. Unit 3, lesson 4, there are 29 petri dishes (high quality), 50 stiring sticks, and 100 paper plates. Materials that would normally be found in the classroom like coloring utensils and such are not included.

To what extent do the materials support Criterion 3B? Include your reasoning.
The materials support Criterion 3B because there are enough materials to allow students to do the investigations themselves and the materials include the tools necessary to make observations and measurements and conduct investigations.

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
There are images of diverse students and information about scientists from a variety of backgrounds in the text. The text has built-in reading support, flash cards, vocabulary words, annotating capabilities and can be changed to Spanish. There are checks for understanding, where students answer a questions after reading/listening to a section of the text.

To what extent do the materials support Criterion 1A? Include your reasoning.
The materials support Criterion 3C because there is a range of text types and genres, both print and online, and are embedded in learning experiences. Texts support context-specific academic vocabulary and they reflect the diversity of our students and society in a culturally responsive manner. In addition, the materials include supports for reading comprehension for a variety of student needs.

Evaluator: 13 Grade Level: Kindergarten Program: TCI- Bring Science Alive

Referenced, adapted and formatted from the following documents:

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Washoe County School District Needs Evaluation

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