Evaluator: 25 Grade Level:3rd Program: TCI Science Alive

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
In the 3rd grade Unit 2 Forces and Motion students watch a video introducing the anchor phenomenom in a storyline about a girl who went to a carnival and wondered how the swing ride rises and spins. Students are asked to help Deb understand how carnival rides and games work. Students work collaboratively to

investigate forces and motion in 3D hands-on learning explorations referring back to the unit's anchor phenomenon and then give a scientific explaination of how the carnival rides work.

To what extent do the materials support Criterion 1A? Include your reasoning.
The materials support Criterion 1A because students are asked to think about a real life situation at a Carnival and examine force and motion. Then they use their learned knowledge and apply the learned concepts to the unit's anchor phenomena explaining how the carnival ride's swing works.

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
In Lesson 1 of the 3rd grade unit Forces and Motion students plan and conduct an investigation to identify the forces acting on an object and how they change the object's motion. They explore what happens when a ball is thrown at cans. Some of the cans fall down but others do not. They explore how objects in contact exert forces on each other. In lesson 3 students explore patterns of motion by working in groups to observe and measure patterns of motion and then predict about future motion. In Lesson 4 students use the Engineering design process to help a jewelry store design a latch to a jewelry box using magnetic force.

To what extent do the materials support Criterion 1B? Include your reasoning.
The materials support the Criterion 1B because students use grade-appropriate elements of the three dimensions throughout their lesson's of the unit. They explore patterns of motion in order to

understand how a swing ride will rise higher the faster it goes. They apply their understanding of core ideas to solving problems through the engineering design process. By the end of the unit students will give an explanation of how the carnival's swing ride works and design their own carnival game using magnetic force.

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 3rd grade students investigate Physical Science concepts motion and forces in unit 2 Force and Motion and then draw upon their learning of motion in the 4th grade unit 2 on Energy to see how motion and energy are related. Then, in the 5th grade unit 3 Changes in Matter they continue to relate scientific concepts previously learned to how matter changes.

To what extent do the materials support Criterion 1C? Include your reasoning.

The materials support Criterion 1C because materials make connections between grade level units and lessons within units build upon prior lessons to connect student's understanding towards the performance expectation.

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
In the 3rd grade Unit Forces and Motion there are multiple opportunities for the teacher to check for understanding. For example, in lesson 2 students are asked to explain what will happen when forces are balanced or unbalanced in a scenario where two kids are arm wrestling. They will write their explanation in their science journal. The teacher will be able to check on their understandings and misconceptions.

To what extent do the materials support Criterion 2A? Include your reasoning.
The materials support Criterion 2A because there are multiple checks for understanding built into the investigations, classroom discussions, tasks and engineering challenges. In the digital simulations students get immediate feedback as they interact and engage with the phenomenon.

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
Multiple modalities are used throughout each unit. For example, students conduct first-hand 3D investigations in the 3rd. grade Unit 2 Forces and Motion. They explore force and motion in classroom experiences such as observing swings rise higher the faster they are swung. Another example is in lesson 2 where students watch the Video "5,4,3,2,1 Lift Off!" to investigate how a rocket denies gravity to launch into space and then investigate using concrete materials to see evidence of balanced and unbalanced force. In lesson 4 students read an article about how magnetic force has improved how trains move and float and then go on a scavenger hunt to find items that use magnets.

To what extent do the materials support Criterion 2B? Include your reasoning.

The materials support Criterion 2B in many ways. Students have multiple concrete experiences investigating scientific concepts of force and motion. Other opportunities through the unit's lessons provide many other ways to learn about the science concepts such as reading informational articles, videos, classroom discussions and engineering challenges.

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
There are many supports for students to make sense of the phenomena throughout the unit's lessons. For example, in 3rd grade's Unit 2 Forces and Motion lesson 1 the students discuss with their peers whether they have ever been on a ride at a carnival and what the experience was like. They explain in writing about their understanding in a check point section of their science journal.

To what extent do the materials support Criterion 2C? Include your reasoning.

The materials support Criterion 2C because students have supports for sense making at the individual and group level throughout their lessons. Students participate in scientific discourse for sense making orally and in writing.

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
Materials include supports for the teacher to learn about the science as well as the pedogogy and student preconceptions. For example in the "Skills and Toolkit" the teacher can explore how to support students in making claims with evidence in the the "Literacy in Science" section. It gives the teacher concise definitions for what a scientific claim is, "The claim is where you introduce your hypothesis or the answer to a question you are trying to solve by gathering data." Another example comes in lesson Unit 2 Forces and Motion lesson one students ask questions about the anchor phenomenon. The answer key provides sample questions that students may respond with. This can help the teacher be prepared for how students might think at this grade level.

To what extent do the materials support Criterion 2D? Include your reasoning.
The materials support Criterion 2D because there are many supports provided for the teacher to plan and give correct instructions. There are resources to help with connected subjects such as literacy. Overviews of the lessons help the teacher plan for instruction.

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 four units, each representing anywhere from 20 min. a day to 60 min. a day for instruction. There is a Fast Track Lesson Guide that is 64 minutes or The Master Lesson Guide(Fast Track + Extensions) that provides 107 min. of instruction, Extensions, and Simple Science sections that support teacher's in their pacing and time allowance. In each lesson the time that is suggested for each part of the lesson is provided. There are teaching slides that can be used for online teaching or projecting in the classroom.

To what extent do the materials support Criterion 3A? Include your reasoning.
The materials support Criterion 3A in that there are options for time frames that can support instructional minutes in science.

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
For grade 3 Unit 2 Forces and Motion there are quality materials and equipment. For example, there area laminated card stock vocabulary cards for use on a science wall. The materials are grouped together in bags for each unit's lesson. This saves the teacher time in preparing for instruction. The magnets needed for lesson 4 are sturdy and meant to be shared with a partner. They are of quality and will last for multiple uses. Most materials needed for each lesson are included in each lesson's bag. Any pictures are laminated on heavy card stock and will last through time.

To what extent do the materials support Criterion 3B? Include your reasoning.
The materials support Criterion 3B because each unit has an equipment/materials bin that provides most of the needed materials to conduct all of the investigations. There are enough materials for partners to share during three-dimensional learning activities. The materials are bagged together for each lesson saving teachers time during preparation.

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
Texts include a science journals with color photos that support scientific concepts. All necessary questions, tables, and diagrams are included in the journals. For example, In 3rd grade's unit 2 Forced and Motion during lesson 4 , What can magnetic forces do?, on pages 75 & 76 the observing guiding question is provided, "Have you seen magnets before? What do they stick to? What do they not stick to?." A photo of an electric magnet picking up a bundle of wire is shown. Then, the investigation "Exploring Cause-and-Effect Relationships with Magnets"is layed out step by step.A table is provided for students to write their questions, causes, and effects on. An interactive Notebook is provided for blended learning as well. Texts and journals are provided in English and Spanish.

To what extent do the materials support Criterion 1A? Include your reasoning.
The materials supports Criterion 1A because texts are provided that highlight specific grade level scientific vocabulary and definitions students need to respond to the guiding questions. The materials provide needed tables, texts, and phenomena for students to make sense of the science.

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Referenced, adapted and formatted from the following documents:

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Washoe County School District Needs Evaluation

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