Evaluator: 17 Grade Level:5th Program: TCI Bring 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
For every lesson in a unit it starts with observing phenomena. For Living Things and Ecosystems it starts with a picture of a boar and asks "How do you thinkg different types of animal are able to meet their needs and survive together in the same place?". The next slide after that asks students what question they have

about this phenomena. Phenomena is the verbiage used in that question. Towards the end of the lesson there is another opportunity for the students to make sense of the phenomena by using what they learned to explain the original phenomena question asked at the start of the lesson. It is called making sense of phenomena and it is at the end of each lesson. It seems to be a discussion activity before students answer a prompt with claim, evidence, and reasoning.

To what extent do the materials support Criterion 1A? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

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
The students are using data already gathered and given to them to analyze. There are handouts for the students on the SEP's which can be found on-line under the support tab for skills tookit. Within each unit and lesson the 3 Dimensions are listed that are being taught. There is questions for the students that incorporate the 3 Dimensional verbiage, such as cause and effect. The students conduct a quick activity about gravity and identify the cause and effect of what they did. They then write a claim, evidence and reason and share it with their classmates, then as a class they create a single class CER. They watch some examples and then revise their claim. The 3-D's are being taught together and not isolated. There is one engineering activity per unit. It comes at the end of the unit.

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

Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

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
This program starts with Living Things and Systems then moves on to Earth Systems, then Changes in Matter and ends with Earth, Moon and the Stars. Air is addressed in the first 3 units. There are lessons correlations for each lesson on-line and in the manual that shows how it ties into other subject standards. There are a lot of reading and writing involved in the program. The journals are full of tables, readings, writing prompts and some math. For the gravity lesson, key ideas and details are used to help the students understand what they are reading. The assessments include a lot of informative writing. Developing models is built

upon throughout the units as well as cause and effect. Other CCC's and SEP's are as well.

To what extent do the materials support Criterion 1C? Include your reasoning.
Click or tap here to enter text.

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
The assessments consist of multiple choice, drawing a model with given parts of the model, a writing prompt (one was writing a comic strip). On-line there is a bank of questions if you would like to create your own test. The rubric is pretty general for grading the test (Proficient 2pts: wrote a script and chose visuals that describe how energy flows through the bison's ecosystem). There are slider questions for each lesson that is student self reflection. Formative assessment is science journals, on-line quizzes and games, checks for understanding (on-line and in the journal), simulations, wrap up, and making sense of phenomena. Performance assessments are on-line as well. The review guide has a sample assessment for the lessons. The guide states how the questions are 3 Dimensional. Most are multiple choice questions. The questions do use DCI, CCC and SEP vocabulary in them. Ex: Describe all the ways that your body uses the

matter and energy in food to get through the day. Within the lessons there are answers for the teachers to look for. A lot of the tables say answers will vary. The claim, evidence and reasoning tables provide answers for the teacher.

To what extent do the materials support Criterion 2A? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

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
There is a lot of student having to read about what others have done, analyzing data given to them, reading texts and filling in notes that tell the students what to write. There are a lot of opportunities for students to draw diagrams. There is very little opportunity for the students to do hands-on investigations. In the Living Things and Ecosystems unit students dissect an owl pellet and work with yeast. There are 8 lessons in the unit. The last lesson of each unit has an engineering project. These engineering projects directly connect to the science that was being taught. Students learn about the different phenomena and the information and activities directly connect to the phenomena. There seems to be a bit of teacher modeling for students. For instance, a teacher is to blow up a balloon, let the air out, tie balloons to a ruler and so on. The students watch and discuss as the

teacher models. They read about plants, but do not grow them. There are on-line games, teaching slides and vocabulary activities for students to complete.

To what extent do the materials support Criterion 2B? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

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 is plenty of opportunity for the students to write about their thinking. The teacher manual does not explicitly say when to discuss, it does pose questions that you could discuss as a class. In all of the lessons science vocabulary is used. (phenomena, modeling, particles, etc.) Students have the opportunity to write questions they have about phenomena. There are graphic organizers in the journal to help students. There are show what you know activities where the students talk in pairs. It seems like this program is stronger in independent work and not group discussions. Students are not given the opportunity to design their own experiments. When there are hands-on investigations, the students are given roles. There are 5 roles. The vocablulary activities in the journals are fill in the

blanks and some activities involve word banks. There are on-line vocabulary cards, but no word wall cards.

To what extent do the materials support Criterion 2C? Include your reasoning.
Click or tap here to enter text.

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
The anchoring phenomena are listed at the beginning of the Lesson Guide. The program also lists the DCI, CCC and SEP's for each lesson. On page 5 of the manual there is a Unit Progression section that tells teachers the progression of student learning for the unit. Within the unit and lessons there are Teacher helper notes that offer lesson support for the teacher and tells they what they might need to help the students with. The program gives sample answers for teachers. At the beginning of a unit the standards, DCI's, CCI's, and SEP's being taught are listed. There is a lesson overview which gives the objectives that are written as Students will… Pacing information is given. For example, page 15 of the Lesson Guide says, "Fast Track Investigation-44 minutes" and, "Master Investigation- 97 minutes".Vocabulary is listed for teachers There is some content knowledge shared to teachers on page 18 under Student Text. A learning progression is on page 19 that talks about how this lesson is connected to second grade standards and how it will tie into middle school science. EL section on page 19 gives ideas for supporting EL learners, like providing a word bank for the ecosystem cards, sentence stems, and posting vocabulary words in the classroom. There are suggested activities for Students with Special Needs. One example is, the teacher does a Think-Aloud Model. On page 24 in the teacher manual it has tips for emeringm expanding and bridging levels for EL learners. This matched

WIDA testing. For advanced learners, on page 20 it mentions research. Additional reading opportunities are listed on page 20 as well. These parts that I mentioned are at the beginning of each unit. On-line there is a breakdown for the lessons that tell them how long to take on each part of the daily lesson. The students see the time for each section as well.

To what extent do the materials support Criterion 2D? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th 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
Each unit has 7 or 8 lessons with a performance task. There are two lessons for each lesson on-line. Fast Track are anywhere from 39 to 67 minutes and master lessons are 82 to 97 minutes long. According to the pacing guide on-line, the longest lesson is 205 minutes. All of the other lessons are less than that. This would not meet our districts recommended weekly minutes. There are readings in the student journal that do not seem to be factored into the teaching minutes on-line or in the manual. There are no graphic orgaizers for notebooks since they provided a student science journal for each unit. There are vocabulary games, lesson games, notebooks, texts, and videos on-line for teachers and students. There is a Spanish version of all student science journals and for on-line materials. All of the teacher materials are in print and on-line. I did not notice this program being responsive to other cultures, genders, etc. The on-line versions seem to be easily accessible at home.

To what extent do the materials support Criterion 3A? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

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
Only 6 owl pellets and tweasers. For each unit the largest amount of materials are 6, such as droppers, hand lenses, flashlights, convex lenses, tubes, etc. You would only be able to have six groups. If you have a class of 34 that is about 5 children per group. Most of the materials would last through a couple of uses. Theses materials are seeds, craft sticks, cotton balls, etc. Other materials like graduated cylinders would last for years, you only get 6 in a kit though. You would need to purchase an extra refill kit for larger classes. For changes in matter the teacher will needs to supply gloves, aprons, and safety goggles. Teachers supply the basics like paper towels, water etc. Only one balance scale and ruler is provided. No pitchers are provided.

To what extent do the materials support Criterion 3B? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

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 is no other texts other than what is in the science journal. There is a media library that shows all of the illustrations and videos. There is a list of biographies for scientists like Rachel Carson on-line. There are EL strategies given for all lessons. There is text-to-speech on-line. There are two levels for the journal readings. There are vocabulary activities to support the academic vocabulary.

To what extent do the materials support Criterion 1A? Include your reasoning.
Click or tap here to enter text.

Evaluator: 17 Grade Level:5th Program: TCI Bring Science Alive

Referenced, adapted and formatted from the following documents:

Achieve, Inc. (2016). EQuIP Rubric, Version 3.0.

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

Achieve, Inc. (2016). Using Phenomena in NGSS-Designed Lessons and Units.

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

Brennan et al. (2017) *Priority Features of NGSS-Aligned Instructional Materials: Recommendations for Publishers, Reviewers and Educators* [White paper].

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

BSCS Science Learning (2018). NextGen TIME

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

National Academies of Sciences, Engineering, and Medicine (NASEM) (2017). *Seeing Students Learn Science: Integrating Assessment and Instruction in the Classroom.* Washington, DC: The National Academies Press.

National Research Council (NRC) (2012). *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas.* Washington, DC: The National Academies Press.

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.