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
The Amplify Properties and Materials unit presents a real-world problem to the school principal employing 2nd grade students help to make a glue for school use. Students learn to design a mixture with desired properties for a specific purpose. Therefore, the unit design problem is to design a better glue mixture than what is used now in the school. There are four-chapter questions: 1. How can you make a sticky glue? 2. Can heating a

substance (and returning it to its original temperature) make it better? 3. What ingredients can be used to make a glue that is sticky and strong? and 4. What is the recipe that best meets our design goals?

To what extent do the materials support Criterion 1A? Include your reasoning.
The materials for the 2nd grade Amplify Properties and Materials unit support Criterion 1A in that the driving question is woven throughout the chapters. The four-chapter questions refer directly to answering the unit problem. All hands-on and support materials keep the unit design problem on the forefront as scientific concepts build throughout the unit to solve it.

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 Chapter 2 of 2nd grade Amplify Properties and Materials unit, students answer the question can heating a substance (and returning it to its original temperature) make a better glue? In lesson 2.1, students narrow the unit question to the investigation question of what can happen after a substance has been heated or cooled and returns to its original temperature. Students compare heated and unheated mixtures of cornstarch and water as well as sort heated/cooled substances in a digital tool (2.2). Lesson 2.2 integrates the three dimensions in that students engage in oral and written argument about whether heating a cornstarch mixture produces the same substance or a different substance (cause and effect).

To what extent do the materials support Criterion 1B? Include your reasoning.
The Amplify materials strongly support Criterion 1B in that the three dimensions are identified throughout the unit and how they connect with the science content. They are also color coded so one can see which dimension

is being considered. Pages 570-572 of the Teacher's Guide of 2nd grade Amplify Properties and Materials identify the 3-D statements at the unit level, chapter level, and lesson level.

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
The Amplify 2nd grade Properties and Materials unit builds coherence with levels of Progress Builds. Students are expected to have prior knowledge that stuff is made from other stuff. The build is as follows: Progress Build Level 1: Different material have different properties. Progress Build Level 2: Mixtures have different properties, depending on their ingredients. Progress Build Level 3: Heating or cooling a substance can change it to a new substance. Progress Build Level 4: A mixture may have a combination of the properties and its ingredients. The example from 1B includes the oral and writing component of the CCSS. To help facilitate successful progress builds, students have the opportunity to cognitively engage in concepts such as in Lesson 1.4 Activity 3 in which students are introduced to providing evidence to support their claims as scientist and engineers do.

To what extent do the materials support Criterion 1C? Include your reasoning.
Criterion 1C is supported in that Amplify materials strategically builds coherence through Progress Builds. The way the lessons are planned allows for students to not only participate in hands-on activities, but to cognitively engage in the content in order to build science understanding. There is also an informative coherence flowchart that graphically shows the connections between students' experiences and the evidence they gather to figure things out and ask new questions.

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
2nd grade Amplify unit Properties of Materials Lesson 1.2 Activity 3 contains embedded formative assessment called On-the-Fly Assessments. Students are asked to make predictions while reading. Teachers check to see if students are making predictions as they read. If they are struggling and not citing evidence for their predictions, sentence frames are offered. The NGSS connection is that this formative assessment reveals student knowledge and use of Practice 8, Obtaining, Evaluating, and Communicating Information.

To what extent do the materials support Criterion 2A? Include your reasoning.
The Amplify materials heavily support the assessment of the three-dimensions in that the Assessment Systems Components shows what dimension of NGSS is assessed in which lesson. The formative assessments include a Pre-Unit Assessment, On-the-Fly Assessments, Self-Assessments, and Critical Juncture Assessments. Summative

assessments include a 3-D Investigation Assessments, Benchmark Assessment, and Portfolio Assessments. Assessment guides/rubrics are available digitally.

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
In Amplify 2nd grade unit Properties of Materials, students set up a "sticky test" to collect more evidence about the properties of two mystery glues. Strategic partnering is used throughout the unit. More examples of uses of new vocabulary are used for additional support. Students who need more challenge compare and contrast the ingredient list of the different glues. The Copymaster Compilation resources includes home investigation sheets for families to do together.

To what extent do the materials support Criterion 2B? Include your reasoning.
Criterion 2B is met in that Amplify offers multiple modalities to develop scientific understanding. Multilingual support includes a unit glossary in many different languages. Print and digital resources are available in English and Spanish. Digital simulations and modeling tools help for exploration and data collection of

scientific concepts that may otherwise be invisible or impossible to see with the naked eye. The multimodal approach of Do, Talk, Read, Write, and Visualize is identified by icons.

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 1.1 in Amplify 2nd grade unit Properties of Materials students first examine four substances and describe the property of each substance. They make predictions of the properties of two substance. Techers are able to assess background knowledge of students by students' initial identification and descriptions. In Activity 2, students' explanations can be assessed with the digital resource Assessment Guide: Interpreting Students' Pre-Unit Explanations About Properties of Substances and Mixtures. Students' awareness of their initial knowledge help them to be ready to make connections to new learning. Strategic partnering is used with different partnering throughout the unit so students have the opportunity to collaborate with students of varying language proficiencies and content understanding. For lessons with high vocabulary load, it is suggested to spend extra time on discussing the meaning and allow students to share their everyday connections to the new words.

To what extent do the materials support Criterion 2C? Include your reasoning.
Criterion 2C is met by Amplify in that students are afforded the opportunity to make sense of the science concepts with multiple modalities in addition to the hands-on activities. The lessons weave literacy components of reading and writing throughout. Students are taught how to make claims and provide evidence as well as interact with hands-on materials. A variety of student collaboration is stressed throughout the units. Student support for sense making is ample.

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
Amplify has a 618-page Teacher's Guide for the Properties of Materials unit. It is available in print and online. Pages 18-23 offers science background as well as unit connections to the NGSS. Preconceptions and pedagogical considerations are present. For example, it states that it is appropriate for students at this age to begin to distinguish various types of materials and mixtures. What are appropriate responses and lesson challenges are available to teachers in the Building Background section of the Teacher's Guide. There is also safety precautions to take like described on the one page PDF on how to smell things safely in Chapter 1 Lesson 1.3.

To what extent do the materials support Criterion 2D? Include your reasoning.
Criterion 2D is supported not only by the comprehensive Teacher's Guide, but also by professional learning and print support. Extensive background information in the NGSS as well as science content is easy to find and comprehend to increase teacher knowledge and confidence in teaching science. Distance learning is also supported with @Home Units and @Home Videos. The teacher support is very strong in Amplify.

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
In Amplify 2nd grade unit Properties of Materials there are 22 lessons of 60 minutes each. The yearly total for three units is 66 lessons of 60 minutes each. This might be short of the recommended 220 instructional minutes a week for science. Materials are available in English and Spanish as well as a glossary in multiple languages. Materials are available in print and online. There are Google classroom slides and projections with pictures and maps. A 75 page unit investigation notebook can be purchased or printed. Black line masters are available including to print. Icons to identify what kind and how to access resources digitally can be found on the Digital Resources sidebar.

To what extent do the materials support Criterion 3A? Include your reasoning.
The Amplify program is comprehensive and offers print and online resources. Materials are easy to find and links to materials work well. The online resources are very well done and coordinate well with the print materials. The recommended instructional minutes may be questionable which may be intentional so districts can customize the pacing of the units to fit their needs. In addition, the unit investigation notebooks may be expensive to print since they are 75 pages each or they may be an expensive consumable to purchase.

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
The unit kit comes with enough materials for two classes of 36 students. There are non-consumable physical manipulatives such as magnets, stopwatches, and graduated cylinders that should last for several years and consumable physical manipulatives that can be replenished with Refill Kits.

To what extent do the materials support Criterion 3B? Include your reasoning.
The Amplify science program contains physical manipulatives and print material to successfully engage in science inquiry. The equipment appears to be of good quality and appropriate for 2nd grade level science exploration. Print material is grade appropriate and well written. The online print material and resources is easy to access and print.

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
In the 2nd grade Properties of Materials unit Chapter 1 Lesson 1.7, students partner read a selection called *Jelly Bean Engineer* after reviewing Partner Reading Guidelines. They review the investigation question of how can properties of a mixture change. The purpose of the review is to make connections to prior experiences and allow student to make predictions for what they may read about. Prompting questions are asked during the reading about text features as well as the investigation question. The reading selection shows diverse individuals as jelly bean engineers. Vocabulary is highlighted and defined when appropriate.

To what extent do the materials support Criterion 1A? Include your reasoning.
Criterion 3C is supported by Amplify materials in that strong connections are made between science experiences and literacy. Amplify strategically weaves literacy throughout the units. Referring to a previous investigation prior to reading and then returning to it after reading, helps to make relevant connections for students. The reading materials showed diverse individuals. In addition to having vocabulary highlighted in the text and defined in the text, teacher notes on the PPT and in the Teacher's Guide offers differentiation and helpful hints while reading the text.

Referenced, adapted and formatted from the following documents:

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Washoe County School District Needs Evaluation

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