Executive Summary

In the spring of 2017, the Nebraska Department of Education (NDE) was awarded an Enhanced Assessment Grant (EAG) from the Office of Elementary and Secondary Education at the U.S. Department of Education for a four-year project targeting the design of assessments meant to measure the Next Generation Science Standards (NGSS) and related "framework-based" (*the Framework*; *A Framework for K-12 Science Education*) science standards. This EAG, titled the *Strengthening Claims-based Interpretations and Uses of Local and Large-scale Science Assessment Scores* (SCILLSS) project, is a collaborative effort among the NDE, the Montana Office of Public Instruction, the Wyoming Department of Education, and a team of researchers and educational measurement specialists including edCount, LLC, SRI International, ACS Ventures, and an elite technical advisory panel of science and assessment experts. Its primary objectives include the design of methods, tools, and a process to support the development of state-wide summative and classroom-based assessments that address the shifts in teaching and learning of science that accompany adoption of three-dimensional science standards.

Traditional assessment strategies may not yield enough evidence of students' abilities to use scientific practice, think critically, and communicate ideas as intended by the *Framework*. At the classroom level, for teachers to effectively implement assessment as part of their pedagogy, they need tools for creating tasks and collecting and scoring student performance. SCILLSS partners developed *A Guide to Develop Classroom-based Next Generation Science Standards Assessment Tasks: A Principled-design Approach* to articulate a replicable principled-design approach and tools (i.e., fillable templates) based on evidence-centered assessment design (ECD) (Almond, Steinberg, & Mislevy, 2002; Mislevy, Almond, & Lucas, 2003, Mislevy & Haertel, 2006) for use by educational stakeholders to develop classroom-based NGSS assessment tasks. The *guide* focuses on classroom-based NGSS assessment practices described as "embedded in an instructional sequence" using educator-developed assessment tasks that generate meaningful information about students' science learning along and during that instructional sequence.

SCILLSS partners also developed *A Toolkit for Designing Classroom-based Science Assessment Tasks Using a Principled-design Approach*. *The toolkit* is designed as a companion to *the guide* in an effort to assist stakeholders in making the principled-design approach actionable in states, districts, schools and classrooms. *The toolkit* includes a collection of materials, resources and tools and templates that state and local education agencies can use or modify for use to facilitate professional learning sessions with educators to design high-quality classroom-based science assessment tasks.

Together, *the guide* and *the toolkit* are intended to support educators in designing assessment tasks and scoring rubrics that support more complex assessments (i.e., multi-dimensional science assessment tasks) and in ensuring that evidence of student learning that is collected and evaluated from such tasks is consistent with the knowledge, skills, and abilities (KSAs) represented by the performance expectations (PEs) and the intended purposes of the assessment. The need for a principled-design approach to assessment design, such as ECD, was explicitly discussed in the National Research Council's (NRC) report on developing assessments aligned to the NGSS (NRC, 2014). A principled-design approach ensures that classroom-based NGSS science assessment tasks measure the integration of disciplinary core ideas (DCIs) and crosscutting concepts (CCCs) with science engineering practices (SEPs) that generate meaningful information about students' science learning. *The guide* and *the toolkit*, based on this principled-design process, are essential in this regard.

In June through August 2019 and January 2020, SCILLSS partners facilitated a series of two-day classroom assessment development workshops with Nebraska, Montana and Wyoming teachers and teacher-leaders using the principled-design approach outlined in *the guide* and the tools, templates and resources provided in *the toolkit*. The workshop goals were (a) to increase participants' knowledge of the characteristics and features of high quality assessment tasks aligned to NGSS-like standards for use within classrooms; (b) to increase participants' knowledge of a principled-approach for developing three-dimensional science tasks aligned to NGSS-like standards for use within classrooms; and (c) to engage participants in a principled-approach to develop design tools and classroom science assessment tasks to support instruction. These workshops were structured to provide participants with a comprehensive step-by-step orientation to the iterative design process and to provide opportunities to collaborate with peers to actively engage in each step of the process.

Following the classroom assessment workshops, to further evaluate the clarity, utility and efficacy of the principled-design process, tools and resources communicated in *the guide* and *the toolkit*, SCILLSS partners collaborated with participating educators to pilot a collection of classroom-based tasks from the workshops with students in Nebraska, Montana and Wyoming. SCILLSS researchers developed the pilot study to address two research goals: 1) to investigate the extent to which the principled-design process is feasible for teachers to use for developing NGSS-aligned classroom assessment tasks, and 2) to evaluate the extent to which the set of assessment tasks generated through this process yields accurate and useful information about students' science learning. SCILLSS partners used the results, feedback, and lessons learned from the workshops and the pilot study to engage in an iterative process of review and refinement of *the guide* and *the toolkit* spanning June 2019 through April 2020. SCILLSS partners are pleased to announce that these resources are now available on the SCILLSS project website for stakeholder dissemination, modification and use at https://www.scillsspartners.org/scillss-resources/.

For additional information about the SCILLSS project or for assistance in the interpretation and use of the SCILLSS project resources, please contact SCILLSS Project Director, Liz Summers, at lsummers@edCount.com or SCILLSS Deputy Project Director, Erin Buchanan, at ebuchanan@edCount.com.

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