Science Assessments for Language Diversity in Early Elementary Classrooms (SALDEE)

Exploring and Learning: Designing Next Generation Science Standards–Aligned Formative Assessments That Integrate Equity, Inclusion, and Language and Literacy Development Needs for First Grade

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Project Overview

There is an urgent need for vetted Next Generation Science Standards (NGSS)–aligned, classroom-based formative assessment tasks for the early grades that incorporate language and literacy diversity of young students into the design. This project is designing instructional assessment materials using the Science Assessments for Language Diversity in Early Elementary Classrooms (SALDEE) approach, which brings together elements of evidence-centered design (ECD), an equity and inclusion framework for designing science materials, and inclusive design principles for language-diverse learners. In this poster, we highlight how we integrated equity, inclusion, and language and literacy development needs for learners in the early grades.

Development Goals

This project will develop a suite of NGSS-aligned formative assessment tasks for first-grade science and a set of instructional materials to support teachers as they administer the formative assessments to students with diverse language skills and capacities.

Research Questions

1. ***Assessment validity.*** Are the assessment tasks valid and reliable for measuring student proficiencies in science?
2. ***Equity and inclusivity task features.*** Do different task features support access for students who have diverse language and/or literacy skills?
3. ***Instructional validity.*** Are the resources usable and supportive of teachers implementing formative assessment practices in their classrooms?

Design Perspective

This project bridges the Next Generation Science Assessment for Young Scientists (NGSA-YS) and the Equity and Inclusion Curriculum Design (EI-CD) approaches to generate a novel and innovative assessment design and development approach called SALDEE. The combined approach will generate new assessments that reliably measure young learners' NGSS three-dimensional science proficiency and purposefully position equity and inclusivity as central to the design of the assessments.

SALDEE Assessment Design Approach

Identify Collaborators and Gather Information. Work with a set of collaborators (i.e., advisory board, teachers, and teacher's aids) throughout the project to obtain feedback on our process and artifacts.

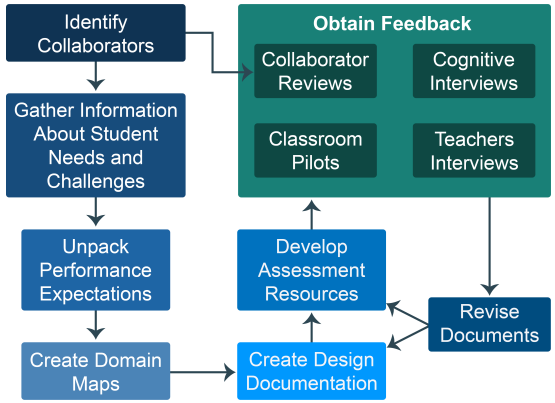
Unpack Performance Expectations. Analyze the NGSS performance expectations (PE) to identify the focal components of each dimension; the expected understanding of students in this grade; the expected prerequisite knowledge; the challenges or misconceptions students might have related to the PE; and the equity, inclusion, and language and literacy needs of first-grade students.

Create Domain Maps. Create integrated dimension maps that illustrate relationships between each aspect of the three dimensions of the NGSS identified in the focal PE and key elements of science-specific language and literacy integrations. Using the integrating dimension maps, we articulate learning performances.

Create Design Documentation. Generate design patterns for each learning performance that includes the *student model* (what we are going to say about a student's proficiency), the *evidence model* (what data we need to collect and how that data will be analyzed), and the *task model* (what tasks need to look like to ensure that students have an opportunity to provide the desired evidence).

Develop Assessment Resources. Create task templates for developing tasks, administration guides for teachers, scoring rubrics, and teacher follow-ups.

Figure 1. SALDEE Approach



Obtain Feedback. *Collaborator reviews* to review our developed materials. *Cognitive interviews* to determine whether tasks are eliciting responses aligned with the target rubric and to evaluate the administration protocols, response processes, and developmentally appropriateness of the tasks. *Classroom pilots* to make inferences about teachers' use of the assessment tasks in the classroom and collect sufficient student response data for the psychometric analysis of task functioning. *Teacher interviews* to determine the usefulness of the assessment tasks and resources and the next steps in our development cycle.

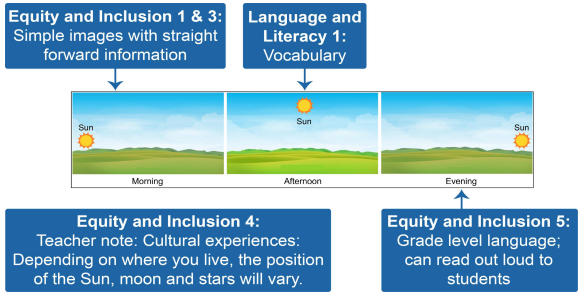
Attending to Equity, Inclusion, and Language and Literacy Development

Equity, inclusion, and language and literacy development are important to incorporate into all stages of the assessment task design process and for all dimensions of each NGSS PE for first-grade students.

To the right is an example of a representation of the Disciplinary Core Idea (DCI) for *PE 1ESS1-1: Use observations of the sun, moon, and stars to describe patterns that can be predicted*.

Notice that this representation incorporates several of the equity and inclusion and language and literacy principles listed.

Figure 2. Sun Observations



Equity and Inclusion Considerations/ Developmental Considerations

1. *Auditory/Visual Perceptual Consideration(s):*
   a. Images should only include necessary information.
   b. Images should have enough contrast to support visual discrimination.
2. *Social-Emotional Consideration(s):*
   a. Some students may be sensitive to bright lights or changing color lights (teachers may need to determine what makes sense in their classroom).
3. *Cognitive Load Consideration(s):*
   a. Definition reminders for key words and concepts should be provided, as needed.
   b. Consider how much information students can hold in their head at a time.
4. *Cultural/Experiential Consideration(s):*
   a. Provide students with background information as experiences related to the amount of sun, moon, and stars may vary depending on the region.
   b. Don't portray girls/women as not caring about science or as needing to be helped to understand or engage in science.
   c. Don't only portray boys/men as scientists or as experts in science.
5. *Language and Literacy Consideration(s):*
   a. If students are not yet able to articulate/express their understanding verbally, they may respond nonverbally (e.g., point to a selection among a set of options to indicate understanding).
   b. When students can't decode words, the words may be read aloud to the student.
   c. Ensure that the language/vocabulary is at the grade level of the student.

Language and Literacy Components

1. *Vocabulary/Phrases (esp. DCI):*
   a. Students should know the terms: sun, moon, and stars.
2. *Visual Representations:*
   a. Students might represent the sun and moon by drawing pictures.
3. *Nonverbal Communication:*
   a. Students might represent the sun or moon by pointing, acting out, and/or using models/manipulatives/cards.

Next Steps

In this next year, we will use this information to develop tasks, rubrics, and support materials. These materials will be tested out with students, and feedback will be gathered from students, teachers, and advisors that will aid in revisions to the tasks.

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