



Three-Dimensional Assessments

By: State Science Education Coordination Committee | Aug 2024

BACKGROUND

What are three-dimensional assessments?

Three-dimensional science assessments are designed to assess students' proficiency in science and engineering practices (SEPs), crosscutting concepts (CCCs), and disciplinary core ideas (DCIs). These assessments provide a more comprehensive understanding of students' scientific knowledge, skills, and ability to make sense of authentic phenomena or solve a problem.

A three-dimensional assessment should meet the following criteria:

- Include tasks that are driven by high-quality scenarios that focus on a phenomenon or an authentic situation/problem
- Require sense-making using the three dimensions
- Be fair and equitable
- Align with the rigor of the SEEd standards

Additionally, assessments need to show where students are on the learning continuum. They need multiple and varied formative assessment opportunities to demonstrate their learning progression towards the performance expectations for a given grade level or course. Summative assessments should require students to transfer their understanding to a new context or phenomena rather than just asking students to recite what they have learned from a previous learning experience.

Why are three-dimensional assessments important to three-dimensional science instruction?

Three-dimensional assessments require students to apply the SEPs (science practices) to reveal their understanding about DCIs (science concepts) and CCCs (the big lenses through which we can view content and phenomena). High quality assessments mirror high quality instruction. Teaching students with three dimensional instruction requires we assess them with three-dimensional assessments.

CLASSROOM APPLICATION

When observing a classroom with three-dimensional assessments, the following **student actions** should be visible:

- Making sense of a phenomenon or an authentic situation/problem by answering a series of related questions
- Using the SEP and CCC from the standard to make sense of the DCI
- Applying their scientific skills, knowledge, and abilities to a new phenomenon in a gather, reason, and communicate process or similar three-dimensional Science learning sequence.

To support three-dimensional assessments, **teachers** plan by:

- Presenting their students with a phenomenon or an authentic situation/problem to engage in problem-solving and sensemaking.
- Encouraging students to use SEP's and CCC's to understand the DCI's

IMPLEMENTATION RUBRIC

| Basic | Emerging | Effective | Exceptional |
|---|---|---|--|
| Assessments have students recall facts based on core ideas. | Assessments are phenomenon based. Students use two of the three dimensions to develop an explanation of the phenomenon. | Assessments engage students in a gathering, reasoning and communicating process to support their sensemaking of a phenomenon. Students use any of the SEP's and CCC's to make sense of the DCI to develop an explanation of the phenomenon. | Assessments engage students in a gathering, reasoning and communicating process that support their sensemaking of a new phenomenon. Students use the SEP's and CCC's in the standard to make sense of the DCI to develop an explanation of the phenomenon. |

RESOURCES

[Three-Dimensional Assessments For The NGSS Made Simple](#)

[Science Task Screener](#)

[STEM Teaching Tools: Assessment](#)

[STEM Teaching Tool #29 - Steps to Designing a Three Dimensional Assessment](#)

[STEM Teaching Tool #30 - Integrating Science Practices Into Assessment Tasks](#)

[STEM Teaching Tool #41- Prompts for Integrating Crosscutting Concepts Into Assessment and Instruction](#)

[USET 11 - PCBL: Demonstrated Competency & Assessment](#)



Utah State
Board of
Education

Teaching
and
Learning