Student Sensemaking of a Phenomenon

By: State Science Education Coordinating Committee | Nov 2023

BACKGROUND

What is student sensemaking of a phenomenon?

A phenomenon is an observable event that occurs in the universe and that we can use our science knowledge to explain and predict. The goal of building knowledge in science is to develop general ideas, based on evidence, that can explain and predict a phenomenon.

Sensemaking is actively trying to figure out how the world works (science) or how to design solutions to problems (engineering). Students *do* science and engineering through the science and engineering practices. Engaging in these practices necessitates students be part of a learning community to be able to share ideas, evaluate competing ideas, give and receive critique, and reach consensus.

In phenomena-based instruction, students experience a phenomenon together (firsthand or through video, images, graphs, maps, etc.) and share their observations and wonderings with the class. The focus of the lesson is pursuing an answer to a question *students* shared; the answer to which requires students to develop a targeted science idea needed to explain how or why the phenomenon occurred.

Why is student sensemaking of a phenomenon important in three-dimensional science instruction?

Student sensemaking of phenomena is crucial in three-dimensional science instruction because it lies at the heart of effective science education and the SEEd Standards. When students engage in making sense of real-world phenomena, they become active participants in their learning. This active engagement fosters a sense of ownership and curiosity, leading to deeper exploration and understanding. Sensemaking involves grappling with real-world phenomena and connecting scientific concepts to observable and relevant experiences. This helps students identify the practical relevance of what they are learning and how it applies to their daily lives.
Three-dimensional learning includes three dimensions: Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas. Sensemaking inherently involves these dimensions by requiring students to engage in practices as they apply crosscutting concepts and explore core disciplinary ideas.

CLASSROOM APPLICATION

When observing a classroom in which the student is making sense of the phenomenon, the following **student actions** should be visible:

- Actively engaging throughout the process of exploring phenomena.
- Using the SEPs, CCCs, and DCIs to make sense of the phenomena.
- Developing, communicating, evaluating, and revising their own ideas.
- Using science ideas to understand and solve real-world problems.

To support instruction where the student is making sense of a phenomenon, **teachers plan** to:

- Elicit students' ideas about the phenomenon through discourse.
- Build a class set of ideas.
- Engage students in sensemaking activities.
- Have students work collaboratively to "figure out" the phenomenon.
- Provide an opportunity to revisit the phenomenon or concept elicited by the probe and revise initial ideas.

IMPLEMENTATION RUBRIC

Basic	Emerging	Effective	Exceptional
Classroom Instruction is teacher-focused and lecture driven without a phenomenon.	Classroom instruction is teacher-focused, as the teacher facilitates sensemaking of a phenomenon.	Classroom instruction is driven by student sensemaking of a phenomenon during a lesson.	Classroom instruction is driven by student sensemaking of an anchor phenomenon throughout a unit.

RESOURCES

Using Phenomena in NGSS-Designed Lessons and Units
STEM Teaching Tool #28: Qualities of a Good Anchor Phenomenon for a Coherent Sequence of Science Lessons
STEM Teaching Tool #47: How can I promote equitable sensemaking by setting expectations for multiple perspectives?
STEM Teaching Tool #50: How Can Teachers Orient Students' Ideas and Sensemaking Practices?
STEM Teaching Tool #92: Using Nature Journaling to identify meaningful local phenomena and support the infinite range of student sensemaking