Science Content Leader Assessment Series

Building Understanding through Phenomenon-Based Instruction

Definition: Phenomenon-based instruction centers itself on real-world examples of natural and designed scientific phenomenon and asks students to use critical thinking skills as well as their prior knowledge to determine what causes a phenomenon, as opposed to just learning about the cause.

Underlying Principles: Science content leaders teaching phenomenon-based instruction must be able to:

- Unpack phenomenon-based instruction and the anchoring phenomenon of a lesson set.
- Launch a phenomenon-based lesson set with an anchoring phenomenon routine.
- Facilitate learning so students make their own connections between the anchoring phenomenon and related phenomena.
- Support student understanding as it progresses within and between lessons.

Rationale: Explaining phenomena allows students to build general science ideas in the context of their application to understanding phenomena in the real world, leading to deeper and more transferable knowledge.

- **ANALYZE** the first set of 2-5 lessons that you will teach in your science classroom in an upcoming unit. Identify the anchor phenomenon.
- **DEVELOP** a plan to facilitate the lessons you selected in Analyze by annotating the lesson set to describe the anchor phenomenon routine.
- **IMPLEMENT** the phenomenon-based lesson set with your students and collect 3-5 artifacts that demonstrate your implementation.
- **EVALUATE** the implementation of your instruction using examples to support your response.

Teaching for Three-Dimensional Learning

Definition: Teaching for three-dimensional learning explores how educators plan for and implement the three dimensions of the science standards: disciplinary core ideas, crosscutting concepts, and science and engineering practices in a science classroom.

Underlying Principles: Science content leaders engage in best practices of teaching three-dimensional learning when they:

- Identify the key features of three-dimensional learning and how they allow students to build knowledge and skills over time (e.g., lesson-to-lesson, unit-to-unit, grade-to-grade, etc.).
- Plan instructional supports to ensure all students engage in three-dimensional learning.
- Support all students' learning as they engage with three-dimensional instruction.

Rationale: When students are able to engage with science concepts through three-dimensional instruction, they more deeply learn science content, understand connections to prior and future lessons, and are more invested in their own learning.

- **ANALYZE** an upcoming set of lessons. Annotate the lessons with notes identifying the performance expectations (PEs), the disciplinary core ideas (DCIs), crosscutting concepts (CCCs), and science and engineering practices (SEPs) of the high- quality curriculum.
- **DEVELOP** Instructional strategies are the techniques or methods that a teacher can adopt to meet the various learning objectives
- **IMPLEMENT** the lesson you planned and submit a video of your implementation.
- **EVALUATE** the implementation of your preparation and/or implementation of the entire lesson set from Analyze, including the lesson you taught in Implement .

Supporting Student Sensemaking through Productive Discussion

Definition: Productive discussion in the science classroom engages students and encourages them to articulate their thoughts, clarify their thinking, engage with peers' ideas, and use collaborative reasoning to support student sensemaking.

Underlying Principles: In order to support student sensemaking through productive discussion, science content leaders should be able to:

- Effectively plan for and facilitate a productive discussion using science "talk moves."
- Anticipate and plan for misconceptions that students may have during the productive discussion.

Rationale: Educators who facilitate productive discussion in their classrooms provide a deeper learning experience for their students. Productive discussions in the science classroom encourage participation in specific lessons, provide opportunities for checking and course-correcting student understanding, and help students make their own connections to phenomena and science concepts.

- **ANALYZE** your previous experience facilitating productive discussions.
- **DEVELOP** and submit a plan for a productive discussion.
- **IMPLEMENT** the productive discussion you planned and submit a video of your implementation.
- **EVALUATE** the implementation of your discussion using examples to support your response.

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Select one Choice micro-credential to complete

Leading Common Planning Time

Common Planning Time is essential to establishing a culture of collaboration and continuous improvement which leads to equitable and effective classroom instruction. During Common Planning Time, teachers should be working alongside grade-level, content-area peers to prepare units and lessons using their curricular materials.

- **ANALYZE** the ways in which you, in your role as a Content Leader, can contribute to specific school goals related to implementing curriculum.
- **DESIGN** Design an agenda for the upcoming Common Planning Time session (no longer than 2 pages in length).
- **IMPLEMENT** your plan and collect artifacts of implementation.
- **EVALUATE** the implementation of your plan by responding to reflection questions.

Facilitating Adult Group Learning

Facilitating adult group learning requires a strong grasp of content, purposeful planning, and methods to assess the impact of that learning. The plan and facilitation of an adult group learning session incorporates effective learning models, structures, and processes. When adult learners are engaged in experiential learning that links directly to their professional learning needs, instructional practices improve and have a direct impact on student achievement.

- **ANALYZE** an upcoming opportunity to (re-)deliver a content module.
- **DEVELOP** annotations for a Facilitation Guide to ensure successful facilitation of the content module.
- **IMPLEMENT** your content module session and capture a video that demonstrates your facilitation.
- **EVALUATE** the success of your facilitation by responding to reflection questions and collecting participant feedback.