

Advancing Tools and Processes for Next Generation Science

Model B: Planning for Instruction

Purpose: Participants will gain a deeper understanding of what phenomena-focused three-dimensional 5E instruction looks like and how this aligns with the vision of the Framework for K-12 Science Education. Participants will develop understanding through an experience with the parts of the Five Tools and Processes focused on developing instructional materials.

Audience: Teachers, district or school-based instructional coaches and leaders, and informal science educators. Professional Development leaders may also be interested in attending to develop a deeper understanding of the process.

Components of the model: Introduction to the NGSS and the Five Tools and Processes (optional depending upon experience of audience), Tool 1, Tool 2 Lite (a shortened version), Tool 3, and Tool 4.

Time: Three one-day face-to-face sessions with work time in-between sessions (recommended) or three full-day sessions.

Introduction

Model B offers an opportunity to help teachers who have some awareness of phenomena-focused three-dimensional teaching and learning develop deeper understanding and enhance classroom instruction. As part of the model, they will develop their understanding of the process to develop instructional units that are both three-dimensional and phenomenon-focused. This model best serves district-based teams who have a goal of changing their instructional practice and who have a structure in place to continue to work together after the professional learning experience. This might be through a professional learning community (PLC) or through the process of materials adoption.

Goals of Model B:

- Deepen understanding and develop a shared vision of phenomena-focused three-dimensional teaching and learning.
- Develop an understanding of the process of planning instruction around explaining phenomena and implementing three-dimensional learning in the classroom.
- Develop a common understanding of how conceptual flow, a storyline related to a phenomenon, and the BSCS 5E Instructional Model support three-dimensional teaching and learning.
- Plan a unit of instruction based on Tools 1, 2 (shortened version), 3, and 4 to implement phenomena-focused three-dimensional teaching and learning.

Participant Outcomes After Completing Model B:

A participant should be able to

- effectively participate in a learning community focused on planning units of instruction that support phenomena-focused three-dimensional teaching and learning,
- articulate the importance of conceptual flow, storyline, phenomena, and an instructional model for teaching and learning, and
- share a plan for a unit of instruction developed using Tools 1, 2 (shortened version), 3, and 4.

Total Time:

- Four days of face-to-face professional learning with additional work time in between sessions, or
- Five-day sequential institute
- Additional time is needed if participants are not familiar with three-dimensional teaching and learning to allow for the Introduction to the NGSS and the Five Tools and Processes experience.

Part 1 Introduction (Slides 1 – 15) (2 hours)

This two-hour session provides an introduction to the NGSS and sets the stage for learning how to use the Five Tools and Processes. An overview of the Five Tools and Processes is included in this introductory session. If teachers are already very familiar with the NGSS, facilitators can modify the introductory session and use it as a brief review of the innovations in NGSS, the conceptual shifts, and research on learning and focus more on the overview of the Five Tools and Processes for NGSS.

Part 2 Tool 1: Using the NGSS to plan a unit of instruction (Slides 1 – 47) (6 hours)

The purpose of Tool 1 is to help teachers develop an understanding of the three dimensions of the NGSS and to use these dimensions to develop a blueprint for designing an instructional unit.

Part 3 Tool 2 – Lite: Using performance expectations to plan classroom assessments (Slides 1-9) (1.5 hours)

In Tool 2, teachers start to plan the assessment and evidence of learning for their unit by taking performance expectations from the NGSS and developing evidence of learning specifications.

Part 4 Tool 3: Using the 5E instructional model to develop a conceptual flow (Slides 1-24) (6 hours)

The purpose of Tool 3 is to introduce and deepen teachers' understanding of the BSCS 5E Instructional Model by developing a storyline anchored in phenomena and conceptual flow that aligns with the 5Es and provides an integrated approach to instruction.

Part 5 Tool 4: Using the 5E instructional model to design learning sequences (Slides 1-17) (5 hours)

In Tool 4 teachers use the storyline and conceptual flow based on the 5E model to outline an instructional sequence with key questions for each activity and the ideal student responses.

Materials, PD Leader Resources, and Advance Preparation

- Refer to the Facilitator Guide for the Introduction and Tools for specific information about preparations for each tool.
- Make sure the meeting space has adequate table space for groups to work with the card decks in Tool 1, and plenty of wall space for hanging chart papers in Tools 3 and 4.