

Explore-Before-Explain Design for Science Sensemaking

1 WHERE DO I START?

Focus on Hands-on

Or

Starting with Assessment Probe

- Problem solving situation, demonstration, or simplified lab
 - *Use what you know works*
- Talk with students about data → evidence → claims
 - *Help students formulate clear lines of arguments*

- Select an Uncovering Student Ideas in Science probe
- Consider asking (“*what do I notice, what do I wonder?*”)
- Ask for reasons for thinking (“rules”)
- Do not give the answers to the pre-assessment (becomes evaluation)

Why is this step #1 in sensemaking?

- Allows students to have a common classroom experience
- Blends contemporary standards (NGSS, CCSS-Math, CCSS-ELA).
- Creates a **conceptual framework** for understanding
- Creates need to know situation with students about phenomenon
- Models the **Nature of Science** (accumulation of data serves as evidence for sense making)

2 WHERE DO I GO FROM THERE?

Clarifying Evidence for Learning

And

Connecting to Frameworks

- What would count as students' successful understanding?
- What evidence would we accept as understanding?
- What methods could teachers use to collect the evidence?

- What disciplinary core ideas are critical for science understanding?
- What science and engineering practices do students use to develop knowledge?
- What crosscutting practices do students use to deepen understanding?

3 HOW DO I ENHANCE UNDERSTANDING?

Connecting to Academic Language

And

Providing Practice Transferring Concepts

- Introduce science and engineering vocabulary in light of students firsthand experiences
- Guide students to explain using readings, discussions, and lectures

- What possible further elaborations can students have to extend learning? How can students test utility of ideas in different situations?

4 HOW DO I KNOW WHEN I'M DONE?

Student Evaluation

Or

- Cognitive shifts occur based on learning by doing

- Students better explain initial ideas using data that serves as evidence

Teacher Evaluation

- Students revise initial probe with scientifically accurate ideas using SEPS and CCCs.