Welcome!

Evaluating Classrooms for Sensemaking Using the NSTA Sensemaking Tool

NSTA National Conference on Science Education
Denver, Colorado
Friday, March 22, 2024, 10:40 am - 11:40 am
Introductions

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Collection of Resources

Denver24: Evaluating Classrooms for Sensemaking Using the NSTA Sensemaking Tool Collection

PRIVATE

2 items

NSTA National Conference on Science Education, Denver, Colorado, March 2024

- Earth & Space Science
- Engineering
- Life Science
- Physical Science

Resources in “Denver24: Evaluating Classrooms for Sensemaking Using the NSTA Sensemaking Tool” Collection

<table>
<thead>
<tr>
<th>Title</th>
<th>Resource Type</th>
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</thead>
<tbody>
<tr>
<td>1. A Framework for K-12 Science Education</td>
<td>Web Page</td>
</tr>
<tr>
<td>2. A New Vision for Science Education</td>
<td>Web Page</td>
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</table>

https://my.nsta.orgcollection/TMHck1HOZ5g_E
The NSTA Sensemaking Tool can be used in coaching cycles that support implementing high-quality instructional materials. Gain experience using the tool to identify sensemaking “look and listen for”s in classroom observations and how to use those observations to facilitate productive discussions.
# Meet the Sensemaking Tool

## Sensemaking Tool

### Single-Point Rubric for Sensemaking Lessons

Mastery of discrete facts or pieces of science content

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“Knowledge in use” or building/using science ideas to explain or predict phenomena or design solutions to problems.

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<table>
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<tr>
<th>Phenomena &amp; Student Questions</th>
<th>Criteria NOT Met/Partially Met Suggestions for Improvement</th>
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Meet the Sensemaking Tool

Sensemaking Tool
Single-Point Rubric for Sensemaking Lessons AND Implementation

Mastery of discrete facts or pieces of science content

Less Like

“Knowledge in use” or building/using science ideas to explain or predict phenomena or design solutions to problems.

More Like

### Phenomena & Student Questions
*What questions are students trying to answer/what problem are they trying to solve?*

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The framework is designed to help realize a vision for education in the sciences and engineering in which students, over multiple years of school, actively engage in science and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields.

The learning experiences provided for students should engage students with their own fundamental questions about the world and with how scientists have investigated and found answers to those questions.
Students experience a phenomenon;

engage in science and engineering practices and

share ideas to develop or apply the

science ideas and crosscutting concepts needed to explain how or why the phenomenon occurs.

NSTA Sensemaking (webpage) resource #3 in the collection
Shifting Instruction Toward Sensemaking

**Information Frame**

Mastery of discrete facts or pieces of science content

**Sensemaking Frame**

“Knowledge in use” or building/using science ideas to explain or predict phenomena or design solutions to problems.

The focus is on individual student engagement in science and engineering practices and/or teacher-led whole group interactions.

Students engage in science and engineering practices collaboratively to make sense of a needed science idea(s).

Less Like

Less Like

More Like

More Like
Shifting Instruction Toward Sensemaking

**Partners** How do the center-column descriptions reflect the “more like” sensemaking characteristics?

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**Less Like**
- Students experience the phenomenon, share questions about the phenomenon, and try to answer a class-identified question about the phenomenon.
- Or, students identify a problem to be solved, share questions about constraints, and design a solution to the problem. Lessons may target only parts of the engineering design process.

**More Like**
- Teachers provided guidance needed to elicit student questions and connect students’ prior knowledge and personal experiences to the phenomenon or problem.
- Teachers provided guidance needed to support students in engaging in science and engineering practices. This may include questions to ask students specific to the practice, sentence stems/frames, and scaffolds.

**Less Like**
- The focus is on individual student engagement in science and engineering practices and/or teacher-led whole group interactions.

**More Like**
- Students engage in science and engineering practices collaboratively to make sense of a needed science idea.

**Less Like**
- What questions are students trying to answer? What problem are they trying to solve?

**More Like**
- What are students doing?

**Less Like**
- What part of the how or why of the phenomenon can students explain?

**More Like**
- How are students moving their science thinking forward together?

**Criteria NOT Met/Partially Met**
- Students make sense of targeted elements of disciplinary core ideas (or parts of ideas) and/or crosscutting concepts they need to explain how or why the phenomenon occurs.
- Note any scientific inaccuracies identified in the suggestions for improvement with clear guidance to connect.

**Criteria Met**
- Teachers have guidance to help move students’ thinking about disciplinary core ideas deeper and may include questions to ask students (that don’t give away “what” moments) and talk moves to support students in building understanding or reaching consensus.
- Crosscutting concepts may be leveraged to help students think about the phenomenon.

**Criteria NOT Met/Partially Met**
- Students have multiple, “necessary opportunities to share ideas, build on each other’s ideas, provide each other feedback, and change their mind. Students communicate their thinking using multiple modalities (e.g., talk, text, drawings, symbols, graphs, gestures).
- “necessary” means student talk feedback directly moves students’ understanding of science ideas forward/deeper (removing opportunities would make it difficult or impossible for students to build science ideas needed to explain the phenomenon.

**Criteria Met**
- Teachers have specific guidance on how to support a sequence of student interactions (i.e., shifting students from independent thinking time to pairs or small groups before students share thinking with the whole class) and scaffolds to help ensure equitable participation.
- Scaffolds could include discipline-specific questions/probes, look and listen frames, sentence starters, and talk moves.
Sensemaking Tool

Mastery of discrete facts or pieces of science content

"Knowledge in use" or building/using science ideas to explain or predict phenomena or design solutions to problems.

Phenomena & Student Questions
What questions are students trying to answer/what problem are they trying to solve?

Criteria NOT Met/Partially Met
Suggestions for Improvement
Criteria Met
Evidence

Less Like
More Like

Make Sense of Science Ideas
What part of the how or why of the phenomenon can students explain?

Criteria NOT Met/Partially Met
Suggestions for Improvement
Criteria Met
Evidence

STUDENTS make sense of targeted elements of disciplinary core ideas (or parts of ideas) and/or *crosscutting concepts they need to explain how or why the phenomenon occurs.

STUDENTS engage in science and engineering practices collaboratively to make sense of a needed science idea(s).

Less Like
More Like

Use Science and Engineering Practices
What are students doing?

Criteria NOT Met/Partially Met
Suggestions for Improvement
Criteria Met
Evidence

STUDENTS have multiple, *necessary opportunities to share ideas, build on each other’s ideas, provide each other feedback, and change their minds. Students communicate their thinking using multiple modalities (e.g., talk, text, drawings, symbols, graphs, gestures).

*necessary means student talk/feedback directly moves students’ understanding of science ideas forward/deeper (removing opportunities would make it difficult or impossible for students to build science ideas needed to explain the phenomenon).

STUDENTS have explicit guidance on how to support a sequence of student interactions (i.e., shifting students from independent thinking time to pairs or small groups before students share thinking with the whole class) and scaffolds to help ensure equitable participation.

Scaffolds could include discipline-specific questions/probes, think alouds, sentence starters, and talk moves.

Less Like
More Like

Student Ideas
How are students moving their science thinking forward together?

Criteria NOT Met/Partially Met
Suggestions for Improvement
Criteria Met
Evidence

The focus is on individual student engagement in science and engineering practices and/or teacher-led whole group interactions.
High School Physics Classroom

Activity 4.2: If you can’t see it, how do you know it’s there?
Green beam created by connecting high voltage to electrodes always bends toward the positively charged plate independent of the electrode metal.

Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. Empirical evidence is needed to identify patterns.

Develop, revise, and/or use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.

Develop and/or use a model to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems.

Whole groups and partner/small groups
## Making Observations

Mastery of discrete facts or pieces of science content

"Knowledge in use" or building/using science ideas to explain or predict phenomena or design solutions to problems.

### Phenomena & Student Questions

*What questions are students trying to answer/what problem are they trying to solve?*

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Enactment of the lesson

Teacher moves
## Making Observations

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**Enactment of the lesson**

“Knowledge in use” or building/using science ideas to explain or predict phenomena or design solutions to problems.

Mastery of discrete facts or pieces of science content
## Making Observations

### Alone Zone
Take two minutes to consider what types of observations you might record for each of the four critical attributes of sensemaking (for example, what does students focused on a phenomenon look/feel/sound like?

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Alone Zone
Take two minutes to review your observations and note which observations might reflect more than one critical attribute of sensemaking (which observations you might record in more than attribute).
High School Physics Classroom

Small Group
Share the observations you recorded in the Sensemaking Tool.

● What are patterns in your group’s observations?

● How did the Sensemaking Tool help you determine what to record?

● What can you say about students’ opportunities for sensemaking based on evidence?
Shifting Instruction Toward Sensemaking

**Information Frame**

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**Sensemaking Frame**

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Making Observations

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Small Group
Which critical attribute of sensemaking might you choose to reflect on with the teacher? Why?

How might you start the conversation?
- I noticed…
- I wonder…
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