Next Gen ASET

Next Generation Alliance for Science Educators Toolkit

Next Gen ASET:
Tools to Critically Examine NGSS is K-12 Classrooms

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Next Gen ASET: An Overview

Need for NGSS PD processes, supporting tools, and expertise to support beginning and emerging NGSS practitioners that:

- Are evidenced-based (*rigorously tested*/externally validated for effectiveness)
- Include practitioners/educators (end-users) as co-researchers
- Are anchored in *fostering on-going dialogue among practitioners*
- Provide a structure for in-depth dialogue in *collaborative PD settings and ongoing communities of practice*

1. **NSF $$$**: Three-year $2 million grant from the National Science Foundation
2. **Collaborators**: Carnegie Foundation, Engineering is Elementary
3. **Project Aims**:  
   - Develop and *field test* processes and tools that help beginning and emerging NGSS practitioners “unpack” NGSS and understand the shifts in curriculum, instruction, student learning  
   - Develop/support a cadre of experts (train-the-trainer model) and network partners who use the tools/processes to support beginning and emerging NGSS practitioners and who contribute to continuous improvement of tools.
Next Gen ASET: Who We Are/Partners

- Our Experience
  - Builds on evidence from 5-year NSF science PD project--10 districts
  - Large nationwide, interdisciplinary team of faculty, teachers, researchers
  - 1 of 6 nationwide projects selected to work with Stanford’s Carnegie Foundation on “continuous improvement” processes
## Next Gen ASET: Who We Are/Partners

### Leadership Team
- Rachelle DiStefano, PI, Director, CSER
- Corinne Lardy, Project Asst. Director
- Christine Lee, Co-I CSER Lead Researcher
- Michele Korb, Co-I, Sci. Ed. Faculty, CSUEB
- Danika LeDuc, Assoc. Dir., STEM Institute
- Karen Yang, ASET Grant Coordinator

### Development Team*
- Howard Lei, Engineering Faculty, CSUEB
- Julie McNamara, Math Ed. Faculty, CSUEB
- Anna Newman, Science Coord., ACOE
- Deborah Tucker, former Sci. Ed. Consultant, CDE

*In addition to Leadership Team members

### External Evaluators
- Joe Krajcik, Michigan State U.
- Helen Quinn, Stanford U.
- Nathan McNeill, U. of Colorado
- Heidi Diefes-Dux, Purdue U.
- Emily Van Zee, Oregon State U.

### Technical Advisors
- Christine Cunningham, Founder/Director Engineering is Elementary, Boston MOS
- Phil Lafontaine, former Director of Professional Learning Support Div., CDE
- Paul LeMahieu, Sr. VP., Carnegie Foundation for Advancement of Teaching, Stanford U.
- Gary Nakagiri, former Science Coord., SMCOE
- Traci Wierman, Director, Curric. Implem. Netwk. Lawrence Hall of Science, UC Berkeley
Next Gen ASET Toolkit: What is it?

• **Problem:**
  • We have a lot of lessons developed pre-NGSS and very few developed post-NGSS
  • How can science teachers take the lessons that they already have and give them an “NGSS boost”?

• **One Solution: Next Gen ASET Toolkit**
  • Tools to help teachers **critically examine** and **focus discussion** around:
    • How **each** of the three dimensions is addressed in a lesson
    • How the dimensions are **explicitly connected** to each other in a lesson
    • What a lesson looks like in the big picture of 3D learning
What Makes a Three-Dimensional Lesson?

Goals for Students: 3D Learning
Bringing the 3 dimensions together lesson-level learning objectives that build towards Performance Expectations (PE)

Grounded in an interesting and relevant phenomenon

Science & Engineering Practices (SEP)

Disciplinary Core Ideas (DCI)

Crosscutting Concepts (CCC)
How does this lesson/unit make explicit connections between the target SEP(s) and DCI(s)?

How does this lesson/unit make explicit connections between the target SEP(s) and CCC(s)?

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    • What a lesson looks like in the big picture of 3D learning
  • Rubrics for each of the three dimensions build upon the format of the EQuIP Rubric (Achieve, Inc., 2014)
    • Reviewer response + Evidence & reasoning + Suggestions for improvement
Next Gen ASET SEP Rubrics: An Overview

Features:
• Each Science and Engineering Practice (SEP) is broken into key components
• Detailed criteria for each SEP
  • Grade band-specific (Currently focused on 6-8 Grade Band)
• Components and criteria based on:
  • NGSS Appendix F
  • Framework for K-12 Science Education
  • NGSS Evidence Statements
  • Research literature

Process:
• Read through a science lesson that is meant to target one (or two) particular SEPs
• Rate the lesson from 0-4 for each component of the SEP
• Record specific evidence and reasoning from the lesson for each rating
• Discuss ratings and evidence with others
• Make suggestions for revising the lesson
Next Gen ASET CCC & DCI Rubrics: An Overview

Features:
- A general base rubric for all CCCs and DCIs
  - Includes guiding questions for rating and discussion
- Grade-band specific criteria from
  - NGSS Appendices
  - *Framework for K-12 Science Education*

Process:
- Read through a science lesson that is meant to target one (or two) particular CCCs and DCIs
- Answer each one of the guiding questions for the lesson
- Record specific *evidence* and reasoning from the lesson for each response
- **Discuss** responses and evidence with others
- Make suggestions for revising the lesson
Next Gen ASET Rubrics: Let’s try it!

Video Reflection
• Read through the Next Gen ASET Rubric for one dimension.
• Watch the video and then use the rubric to rate the lesson for how well it incorporates this dimension.

Think-Pair-Share
• Compare your ratings and evidence with the person next to you.
• How might you improve the lesson to better incorporate this dimension?
• What might the teacher do in her lessons after this to build students’ understanding and/or ability to engage in this dimension?
ASET 3D Map: Back to a Three-Dimensional Context

Grounding Phenomenon  →  Performance Expectation(s)  →  Assessment(s)

Three-Dimensional Learning Goal

Science and Engineering Practice(s)  ↓  Disciplinary Core Idea(s)  ↓  Crosscutting Concept(s)

How does this lesson/unit make explicit connections between the target SEP(s) and DCI(s)?

How does this lesson/unit make explicit connections between the target SEP(s) and CCC(s)?

How does this lesson/unit make explicit connections between the target CCC(s) and DCI(s)?
Next Gen ASET Rubrics: Some Caveats

What these tools are...

- A way to critically examine science lessons to determine:
  - Which key aspects of an NGSS dimension are **present** in a lesson and to **what extent**
  - What **revisions** can be made to the lesson to better **build students’ abilities** to engage in and understand all three dimensions
- Help science educators reflect on:
  - The complex nature of the dimensions (especially SEPs), as described in NGSS
  - How can I build my students’ abilities to engage in all key aspects of these dimensions **over time**?
  - How the dimensions work together to build student understanding of science
- A tool to focus dialogue around what makes a lesson NGSS-aligned

What these tools are not intended for...

- A teacher evaluation tool
- Every lesson to be rated highly in all categories
- Reviewing all eight SEPs, all seven CCCs, and/or many DCIs in a single lesson
For more information, please contact:
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THANK YOU!