Supporting Coherence Across a System of Assessment for NGSS

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Stanford NGSS Assessment Project (SNAP)

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"Important decisions about individuals should not be made based on a single test score. Policy makers should instead invest in the development of assessment systems that use multiple measures of student performance, particularly when high stakes are attached to the results"

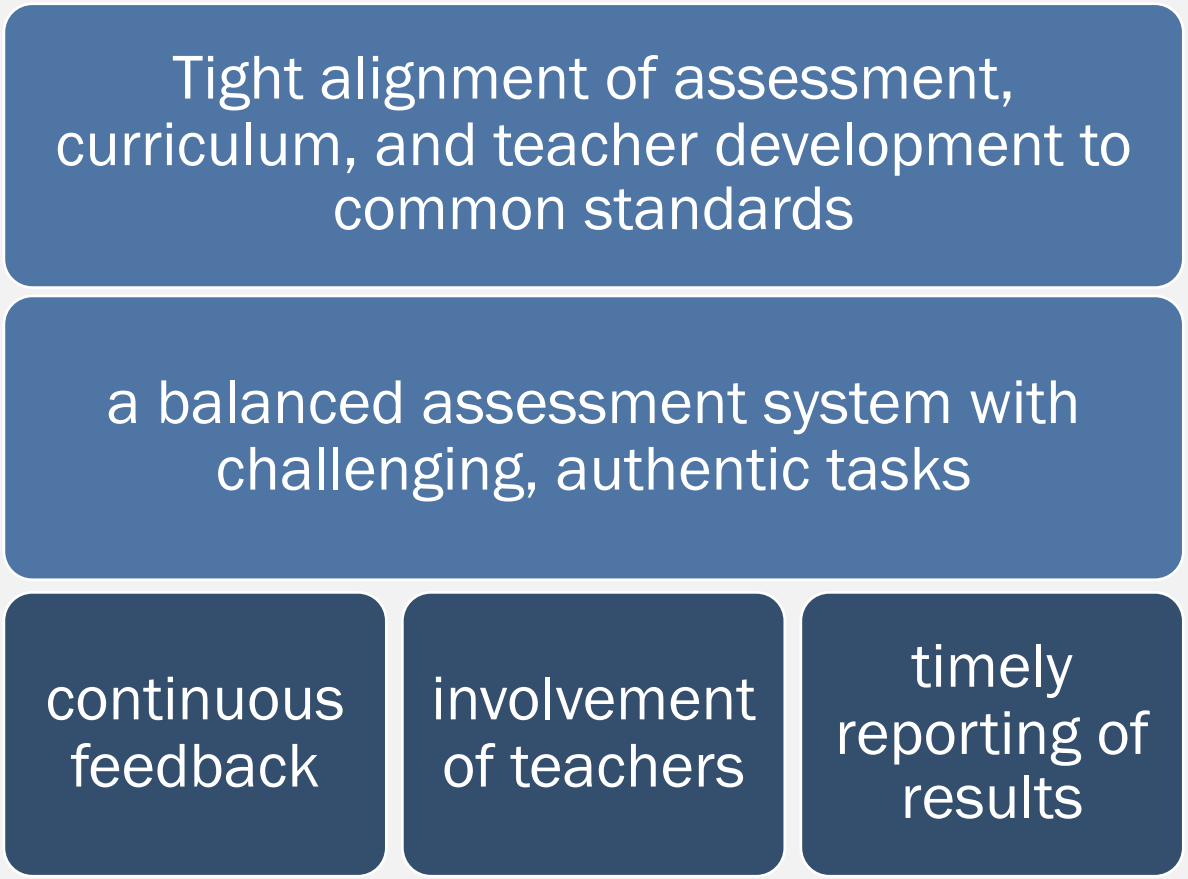
Knowing What Students Know (NRC, 2001)
Pg. 310

"Considerable concern has been expressed in the Commission about the artificiality of 'stand-alone' or 'Drop-in from the Sky' tests.... It is recommended that assessment in education move progressively toward the development and use of diversified assessment systems for the generation and collection of educational assessment data."

--*Assess, To Teach, To Learn: A Vision for the Future of Assessment,* Gordon Commission (2015)

p. 24

Features of High-Quality Assessment Systems



Darling-Hammond, 2010

Research → Practice

How can researchers support a state in building on research-based practices to develop a system of assessment that can quickly and effectively guide implementation of the vision of science learning underpinning NGSS from policymakers to teachers?

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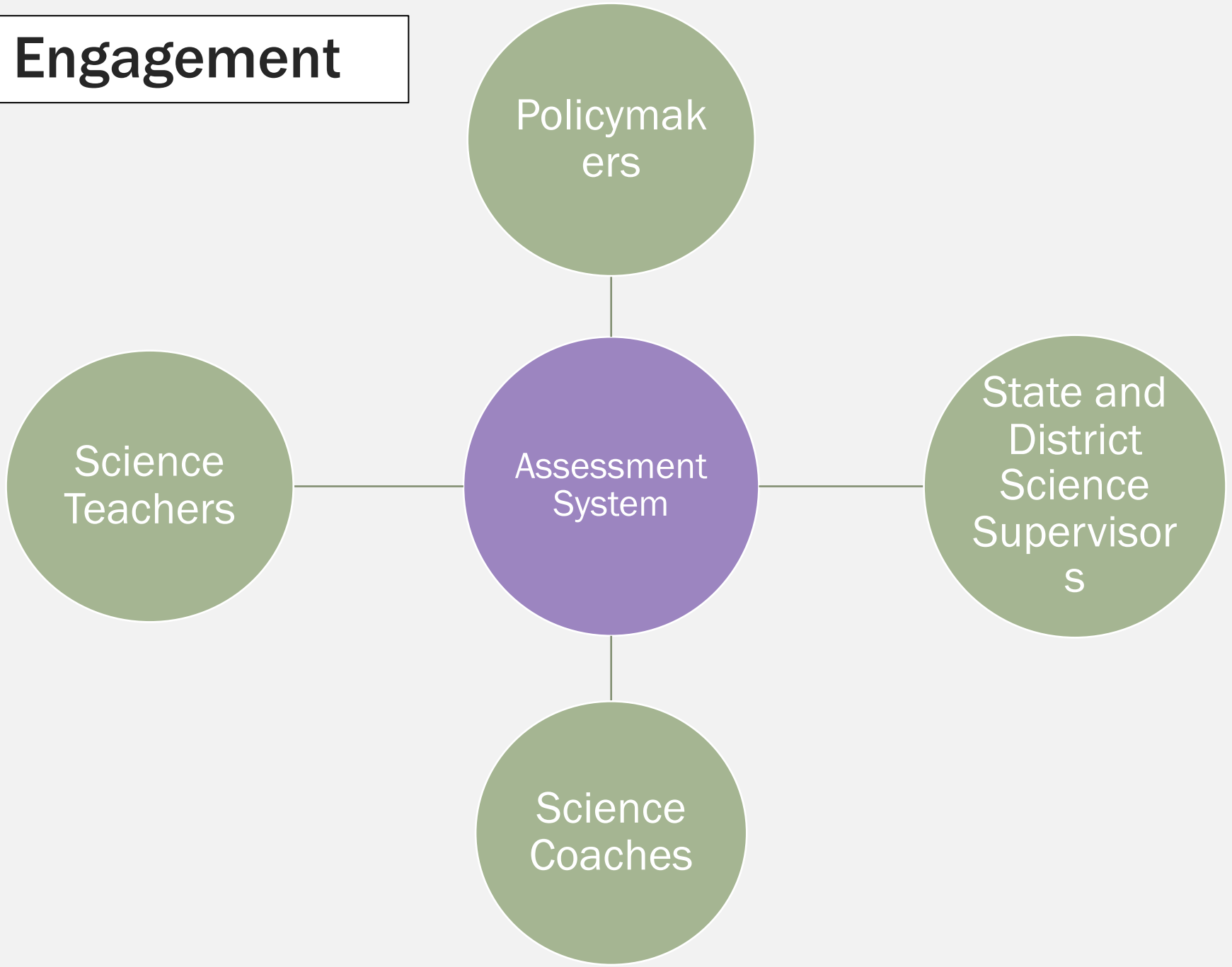
Stakeholder Engagement



System of assessment

Tight alignment of assessment, curriculum, and teacher development to common standards

→ I. Communication tools to support alignment of components of system

a balanced assessment system with challenging, authentic tasks

→ II. Exemplars for 3D tasks

continuous feedback

involvement of teachers

timely reporting of results

→ III. Capacity-building for effective development and use

Darling-Hammond, 2010

Focus Area I. Communication tools about system design

Grade	Part 1: External Mandated Tests		Part 2: Periodic Classroom Assessments	
	Component A: Multi-item types	Component B: Performance Tasks	Component C: Stand-alone Performance Tasks	Component D: Curriculum Embedded Performance Tasks (CEPT)
1st – 4th			(x)	(x)
5th	x	x	(x)	(x)
6th – 7th			(x)	(x)
8th	x	x	(x)	(x)
9th – 10th			(x)	(x)
11th	x	x	(x)	(x)
12th				

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Osborne et al., 2015

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Darling-Hammond, 2010

Focus Area II. Exemplar Assessments

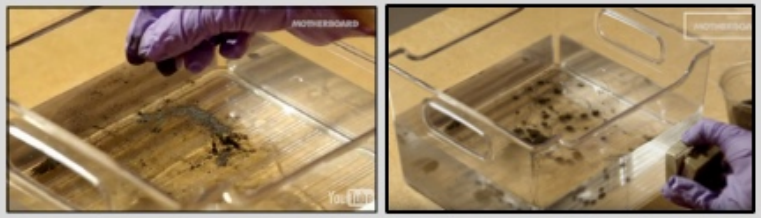
Huge ships, called tankers, carry oil across the ocean. Sometimes the oil in the tankers spills into the ocean. Oil spills can spread out and harm plants and animals nearby. In this task, you are a scientist who is trying to find a way to collect the oil so you can remove it from the ocean.

Oil spill in the ocean **Oil moving toward plant life** **Bird covered in oil**

In the video your teacher will show you, a scientist, Dr. Warner, is doing an experiment. He is testing the research question: Can magnets be used to collect oil in water?

Dr. Warner designed an experiment with these steps:

1. Places water in a large plastic tub.
2. Pours oil into the water.
3. Puts black magnetic powder on the oil.
4. Places a large magnet on the side of the plastic tub.



Dr. Warner puts the black powder in a tub with water and oil (left). Then he holds a magnet outside the tub to pull the oil and powder toward it (right).

Answer the following questions to decide if Dr. Warner's solution could be used to collect a lot of oil in the ocean.

SNAP Principals for high-quality NGSS Assessment

- Engage students in sensemaking about real world questions and problems
- Evaluate what students can *do* with their knowledge
- Foreground students' assets
- Allow for student choice and decision-making
- Integrate peer and teacher feedback

Adapted from SCALE's Criteria for Performance Assessments

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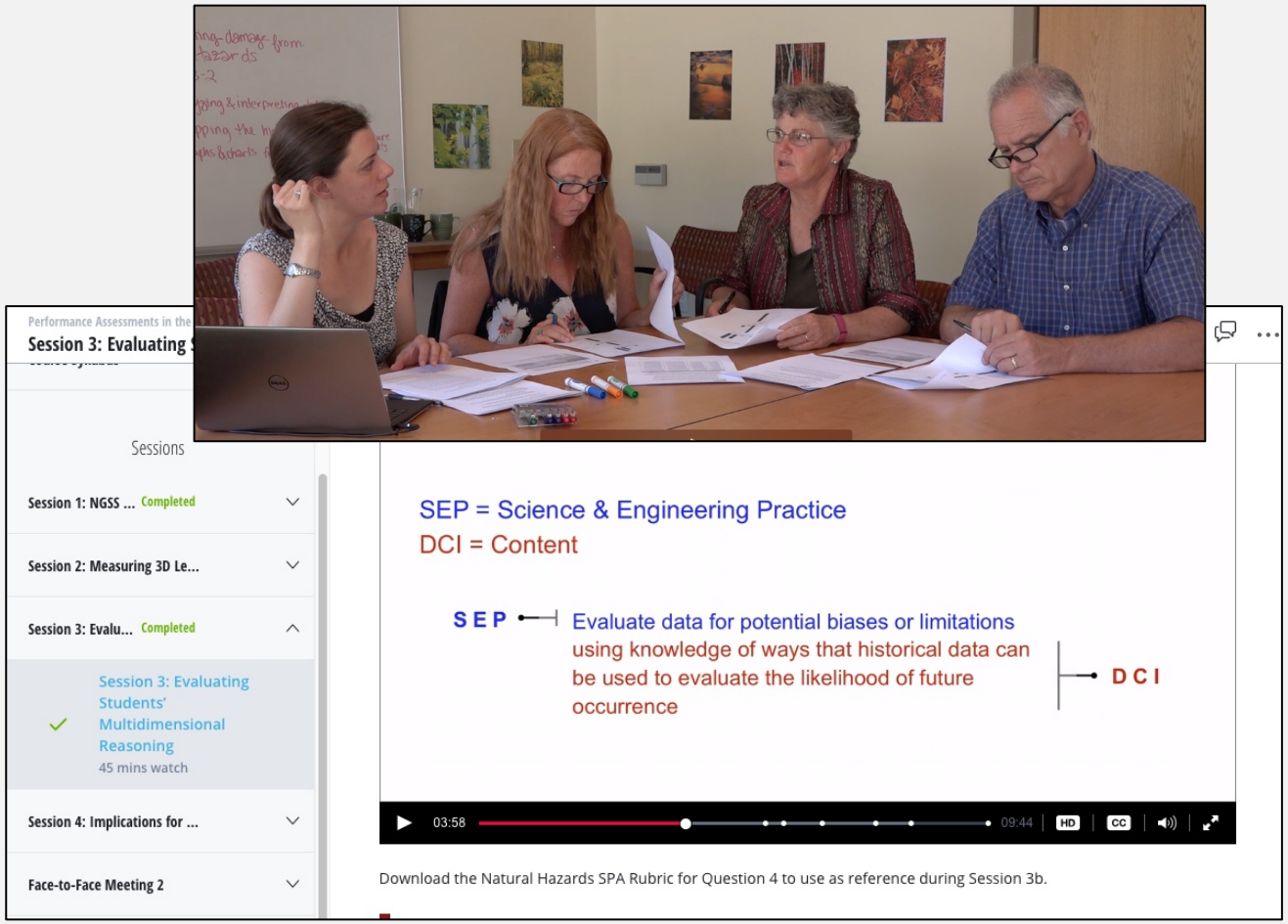
Darling-Hammond, 2010

Focus Area III. Capacity-building



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Principles for effective hybrid professional learning

- Engage in collaborative analysis of student work and planning feedback
- Focus learning around the activities teachers will use in the classroom
- Apply learning to their own students and school context
- Immediate opportunities for practice and feedback

(Wei et al., 2010; Kazemi & Franke, 2004)

A system of science assessment in CA

Results are mixed:

State: Expanded use of complex tasks

Did not use classroom tasks

PA does not look like our models

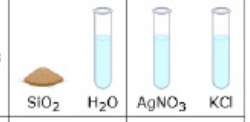
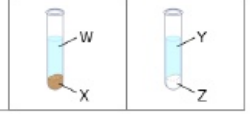
Sent a clear signal to other stakeholders about importance of PA

Leah is learning to use properties of substances to identify a chemical reaction. She conducts two trials.

For the first trial, she pours silicon dioxide (SiO_2) into water (H_2O).

For the second trial, she pours a silver nitrate ($AgNO_3$) solution into a test tube with a solution of potassium chloride (KCl). The diagram shows the reactants and products for both trials.

Reactants and Products for Trials #1 and #2

	Trial #1	Trial #2
Reactants		
Products		

Leah records the properties of these substances before each trial. She also records the properties of the unknown products after the trial. The tables show some of the properties for each substance before and after the trials.

Table 1: Properties Before the Trials

Used in Trial #	Substance	State of Matter	Mass (g)	Color
1	H_2O	Liquid	10.0	Colorless
1	SiO_2	Solid	5.0	Tan
2	KCl	Liquid	12.5	Colorless
2	$AgNO_3$	Liquid	25.5	Colorless

Table 2: Properties After the Trials

Resulted from Trial #	Substance	State of Matter	Mass (g)	Color
1	W	Liquid	10.0	Colorless
1	X	Solid	5.0	Tan
2	Y	Liquid	16.5	Colorless
2	Z	Solid	21.5	White

Leah determines that a chemical reaction occurred in one of her trials. Click the terms that **best** complete the sentence.

A chemical reaction occurred in Trial [ ] because substances [ ] have properties that are [ ] the reactants.

Classroom Performance Assessments: a closer look

Positive developments

- Development has been focused on districts and schools
- Local agencies are using design, development tools, courses, and exemplar assessments to guide work at the local level
- Much of this work is TEACHER driven and is specifically targeted to informing instruction

Areas of concern

- Not necessarily supported by administrators/unaware
- Need structures to enable teachers to engage – collaboration time, incentives for other teachers
- Not tied into system, essentially a parallel system aligned to same standards

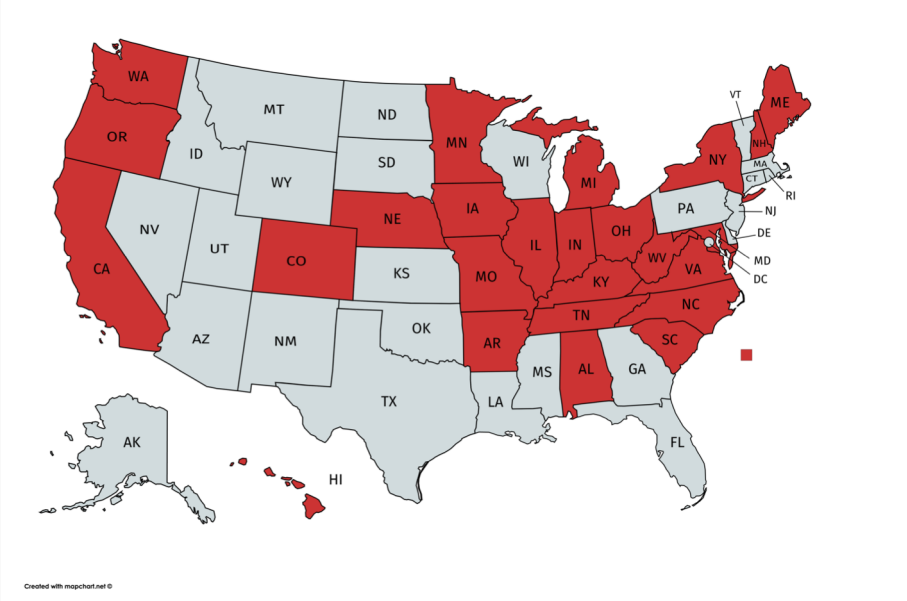
Beyond CA

State Performance Assessment Learning Community (SPA-LC)

28 states considering use of PA for science

Common standards enable use of SNAP capacity-building resources

(>1500 participants)



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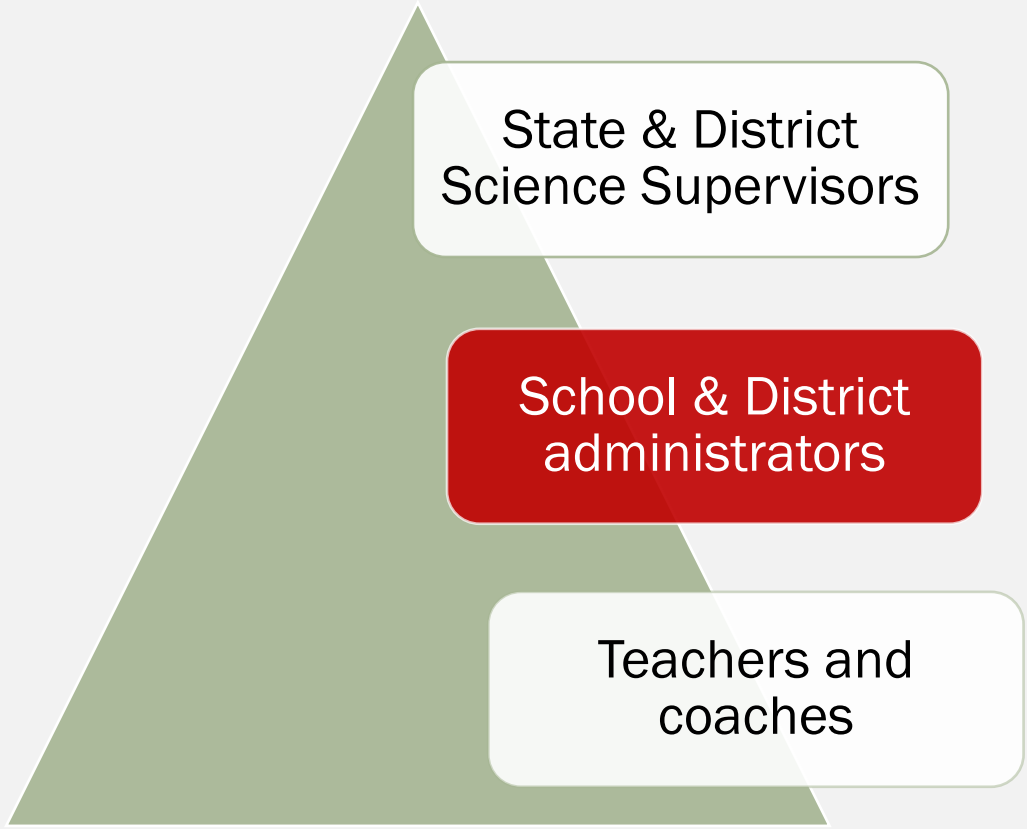
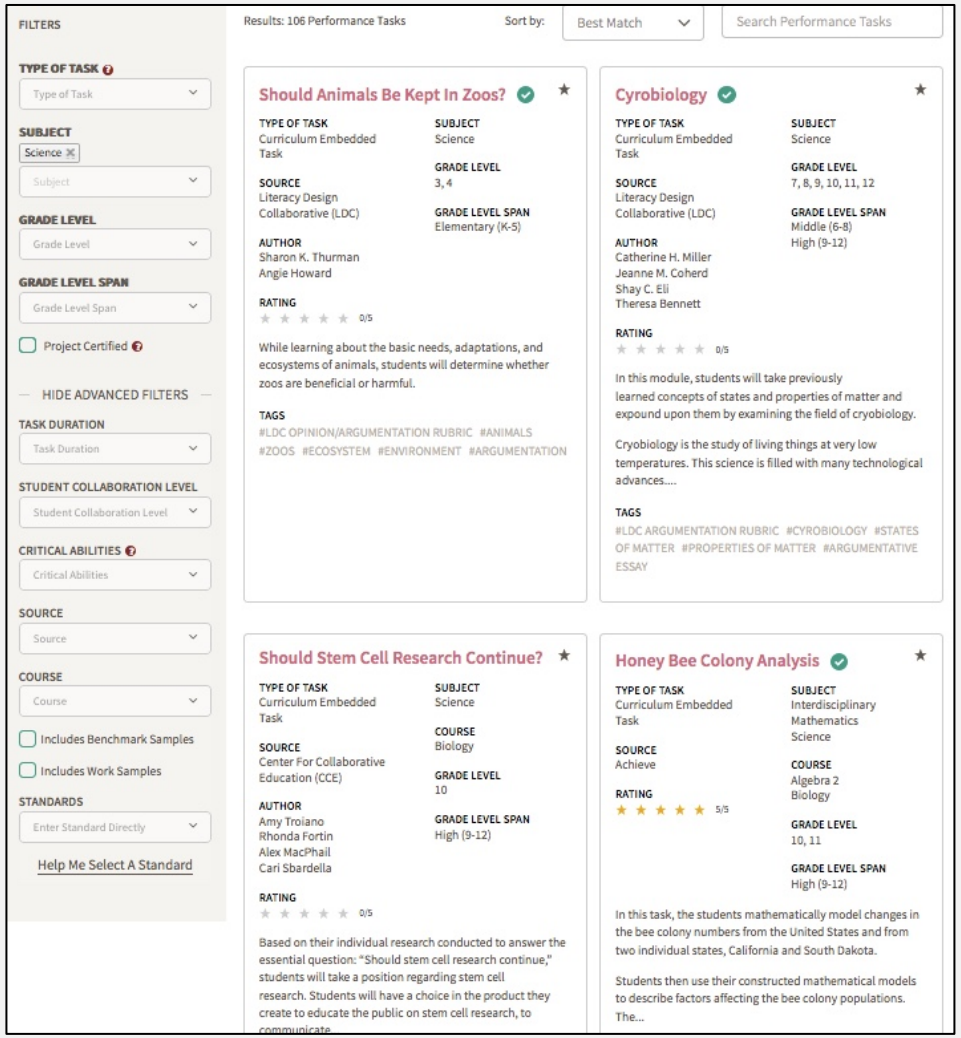
Missing pieces for coherent systems:
Professional learning for administrators



Missing pieces for coherent systems

Platform for collaboration



Missing pieces for coherent systems

Scoring vs grading

?

Goals for NGSS

Develop appreciation of the beauty and wonder of science

Have sufficient knowledge of science and engineering to engage in discussions

Are careful consumers of scientific and technological information

Have skills to enter careers of their choice

NRC, 2012