


Assessing the NGSS in Delaware

September, 2017

Delaware
Department of Education

What are we testing?

Stated Intent of the Standards

- "[Students need a] deeper understanding of content as well as application of content"
  - To prepare students for broader understanding, and deeper levels of scientific and engineering investigation.
  - To become less like novices and more like experts (pg. 3)*
- "Students need to be able to make sense of the world and approach problems not previously encountered—new situations, new phenomena, and new information." (pg. 14)*

*Bybee, R. W. (2013). *Next generation science standards: for states, by states*. Washington, D.C.: National Academies Press.

Current DRAFT Claims

OVERARCHING CLAIM: Students can use crosscutting concepts to define a system and identify cause and effect relationships and patterns that provide an opportunity for using scientific practices such as analyzing data, gathering information, communicating information, developing models or constructing explanations/arguments and applying foundational disciplinary core ideas to make sense of phenomenon relating to the structure and properties of matter, earth and ecosystems and/or space systems.

Subclaim #1: Gathering Data and Investigating Scientific Questions:	**Subclaim #2:** Reason with Evidence and Evaluate Scientific Claims and Questions:	**Subclaim #3:** Construct Scientific Explanations:	**Subclaim #4:** Making Connections:
The student is able to obtain information, ask questions or define problems, plan and carry out investigations, use models to gather data and information and/or use mathematics and computational thinking to gather evidence relevant to a scientific phenomenon.	The student is able to evaluate information, analyze data, use mathematics and computational thinking, construct explanations, develop arguments from evidence and/or use models to predict and develop evidence to make sense of scientific phenomenon.	The student is able to explain or develop an argument to support or refute another explanation of scientific phenomena by arguing from evidence and/or using models to communicate information.	Student is able to use crosscutting concepts to define the phenomena being investigated, recognize changes in the system, and/or to find patterns to use as evidence to support explanations or arguments of how or why the phenomenon occurs.

Depth/Cognitive Alignment

- The evidence we collect needs to VALIDATE the claim(s) we set forth in the development of our assessment
- We need to make sure we are testing what we SAY we are testing.

It’s not a numbers game. . .

Scientific Literacy SCORE

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Performance Level Descriptors—Qualitative Information

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KEY QUESTION:

How will cognitive complexity be accounted for in the development and validation of Delaware NGSS Assessment?

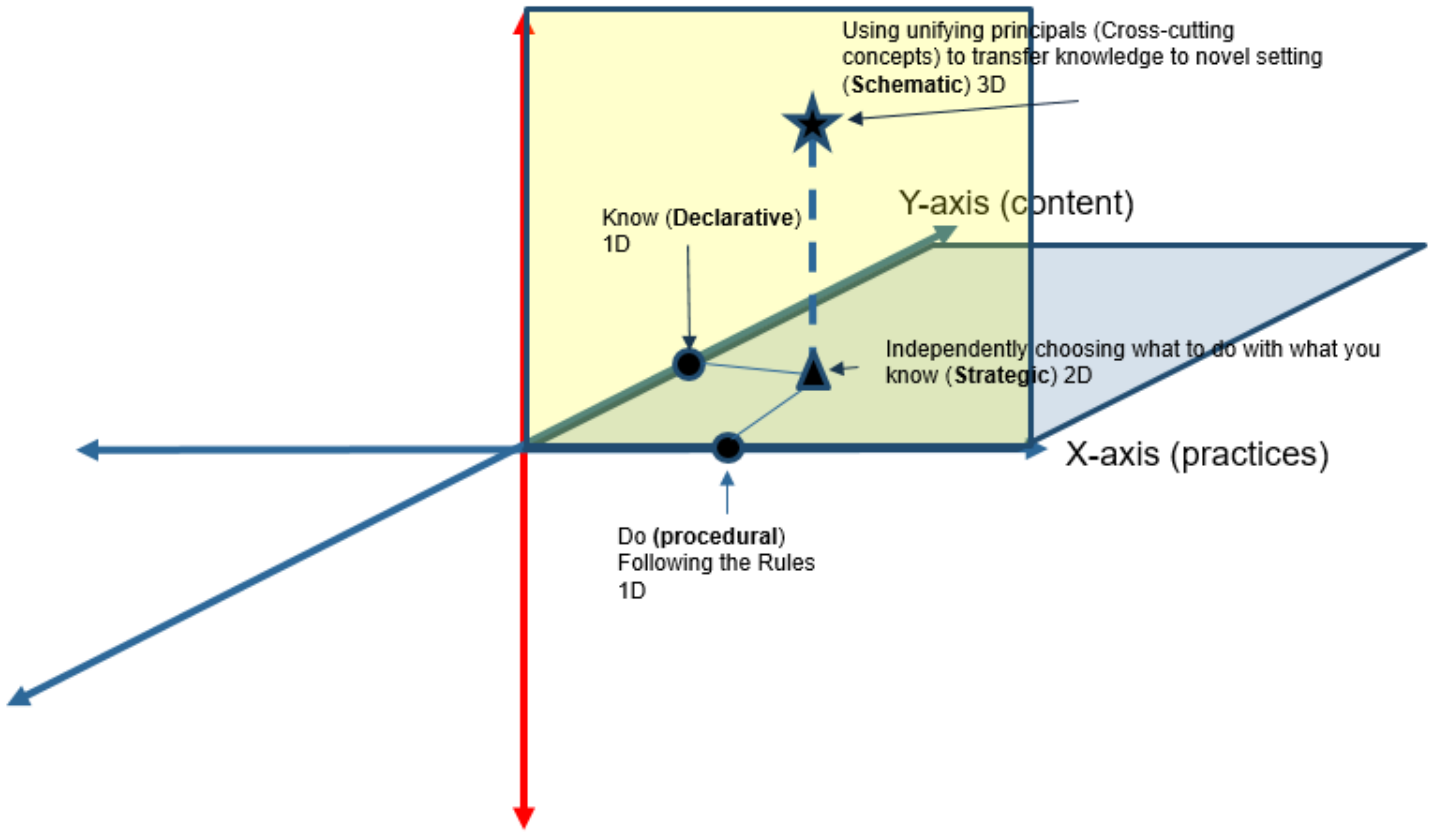
Shavelson's Framework

Way's of Knowing	Definition/Description	NGSS Dimensions
Declarative Knowledge	Knowing "what"—definitions/facts, data or descriptions	Disciplinary Core Ideas
Procedural Knowledge	Knowing "how"—being able to measure appropriately, how to set a fair test, how to graph or follow directions.	Science and Engineering Practices
Schematic Knowledge	Knowing "why"—having or being able to use a scientifically justifiable model that can explain the physical world. Ability to interpret problems, troubleshoot systems or predict an effect.	Using DCIs with SEPs
Strategic Knowledge	Knowing "when, where and how" to use certain types of knowledge in a new situation and knowledge of assembling cognitive operations. Deciding what schematic knowledge can be applied, to set task goals, or to control and monitor cognitive processing.	***Applying*** Cross Cutting Concepts to frame a situation and utilizing appropriate DCIs and SEPs to solve or approach a problem

Cross Cutting Concepts elevate to the 3rd Dimension

"Students should not be assessed on their ability to define "pattern," "system," or any other crosscutting concepts as a separate vocabulary word. **To capture the vision in the Framework, students should be assessed on the extent to which they have achieved a coherent scientific worldview by recognizing similarities among core ideas in science or engineering that may at first seem very different, but are united through crosscutting concepts"** (NGSS, Vol 2, pp. 80-81).

Visualization of Shavelson's Framework



How are we testing it?

Formative in nature

- **Answers the question:** How can you use the knowledge you've just learned?
- **Should tap the following knowledge types:**
  - **Declarative** WHAT do you know?
  - **Procedural** How do you do simple scientific tasks?
  - **Schematic** How do you use what you know to do specific tasks?

Benchmark Assessments

- Proximal (near term) transfer of knowledge and skills. **Answers the question:** How can what you learned in this unit be used to solve similar problems?
- **Should tap the following knowledge types:**
  - **Procedural** How do you do simple scientific tasks?
  - **Schematic** How do you use your declarative and procedural knowledge to solve or complete specific tasks?

Summative Assessments

- Distal (long term) transfer of knowledge and skills. **Answers the question:** how can what you've learned be used to solve new problems?
- **Should tap the following knowledge types:**
  - **Schematic** How do you use what you know to do specific tasks?
  - **Strategic** How do you use unifying principals (cross-cutting concepts) to transfer your procedural, declarative and schematic knowledge to a novel situation?