

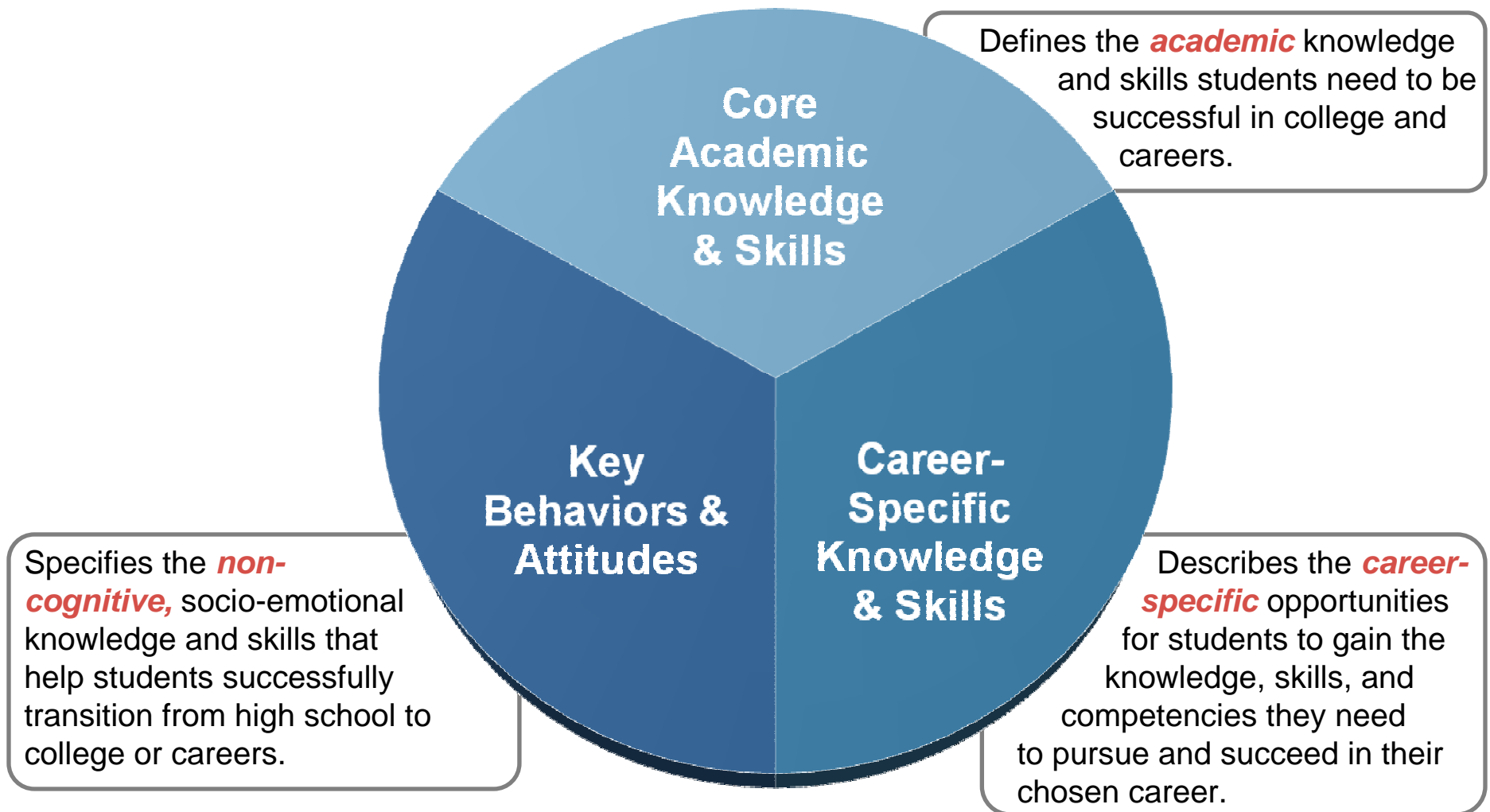


Next Generation Science Standards Update/Discussion Item

Board of Regents
April 2013



College and Career Readiness- Domains



Next Generation Science Standards

Available Materials from the Next Generation Science Standards

➤ Standards

- Broken out by Topic
- Broken out by Disciplinary Core Idea

➤ Supplementary Documents and Materials

- NGSS Front Matter
- NGSS Structure
- Commonly Used Abbreviations
- Why Standards Matter
- Public Attitudes Toward Science Standards
- Video: Why NGSS?

➤ Appendices

- Appendix A – Conceptual Shifts
- Appendix B – Responses to May Public Feedback
- Appendix C – College and Career Readiness
- Appendix D – All Standards, All Students
- Appendix E – Disciplinary Core Idea Progressions in the NGSS
- Appendix F – Science and Engineering Practices in the NGSS
- Appendix G – Crosscutting Concepts in the NGSS
- Appendix H – Nature of Science
- Appendix I – Engineering Design in the NGSS
- Appendix J – Science, Technology, Society, and the Environment
- Appendix K- Model Course Mapping in Middle and High School
- Appendix L- Connections to the CCSS- Mathematics
- Appendix M- Connections to the CCSS- ELA Literacy

NGSS Conceptual Shifts

1. K-12 Science Education should reflect the interconnected nature of science as it is practiced and experienced in the real world.
2. The NGSS are student performance expectations – NOT curriculum.
3. The science concepts build coherently from K-12.
4. The NGSS focus on deeper understanding of content as well as application of content.
5. Science and Engineering are integrated in the NGSS from K–12.
6. The NGSS and Common Core State Standards (English Language Arts and Mathematics) are aligned.

College & Career Ready Context

- In ELA and Mathematics, NYS has adopted the Common Core Learning Standards (CCLS) for grades P-12.
- New York State is currently engaging in a process to evaluate the NYS Science Standards and the Next Generation Science Standards against a research-based set of standards criteria in order to adopt career and college ready standards in science.

NYS Science Standards Evaluation Tool

- Developed by NYSED staff.
- Allows the current NYS science learning standards and the NGSS to be compared to a set of rigorous, research-based criteria.
- Will be used for analysis and comparison by the Science Content Advisory Panel, representatives of the NYS Science Consortium, and the Statewide Leadership Team.
- Will be converted to a public survey to collect feedback from across the State.
- Will provide feedback that will be analyzed to form a recommendation regarding the future of science education for the Board of Regents to consider.

Evaluation Criteria Categories

- Evaluation Tool Criteria was compiled from:
 - AP & College Board Standards Criteria
 - Fordham Institute Criteria
 - Massachusetts DOE Standards Evaluation Tool
- Tool includes the following criteria:
 - Organization of Standards
 - Coherence
 - Clarity and Specificity
 - Content and Rigor

NYS Science Standards Evaluation Tool

**New York State Education Department
Science Standards: Criteria and Rationale for Rating Current
NYS Science Learning Standards and Next Generation Science Standards (NGSS)**

When conducting the review, NY State Science Standards include NY State Science Standards and the Core Curriculum Resource Guide.
When conducting the review, NGSS include the NRC Framework, the NGSS performance expectations, and the Appendices.

- Rating = 1 - Criteria not met based on evidence
- Rating = 2 - Criteria minimally met based on evidence
- Rating = 3 - Criteria adequately met based on evidence
- Rating = 4 - Criteria met to a great extent based on evidence

Table 2 – Science Standards Comparison Matrix: NYS Science Learning Standards and NGSS

Criteria	Rationale	New York State Science Learning Standards	Next Generation Science Standards
Organization of the Standards			
<ul style="list-style-type: none"> • Model pathways/sequences of student outcomes through elementary, middle and high school reflect progression in sophistication of content, concepts, and practices. 	The articulation of grade-by-grade content, concepts, and practices is reflected in evidence based research.	Rating: 1 2 3 4 Evidence: Standards (Std), key ideas (KI), performance indicators (PI), and major understandings (MU) are presented in grade level bands in K-4 and 5-8 and in four discipline specific core curriculum resource guides for 9-12 that are used to develop courses that culminate in Regents examinations. Statewide, a typical/traditional course sequence has evolved but doesn't necessarily reflect an increasing level of complexity.	Rating: 1 2 3 4 Evidence: At K-5, performance expectations (PE) are articulated grade by grade in topic areas related to physical sciences, life sciences, and Earth and space sciences. Similar articulation exists in the disciplinary core idea (DCI) organization schema revealing the progression of content, concepts, and practices K-12. Grades 6-8 and 9-12 are grade banded and an appendix suggests possible courses for grades 6-8 and 9-12 articulated using specific science disciplines or by integrating related PE.

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NYS Science Standards Evaluation Tool

Criteria	Rationale	New York State Science Learning Standards	Next Generation Science Standards
<ul style="list-style-type: none"> Flexible enough to access and use in multiple ways to address curriculum, instruction and assessment 	<p>The ability to develop and/or adopt and then, implement curriculum programs, instructional practices, and formative and summative assessments enhances the opportunities to meet the needs of all students, including students with disabilities, English language learners, and those traditionally under-represented in STEM.</p>	<p>Rating: 1 2 3 4</p> <p>Evidence: Standards document is designed in three grade level bands K-4, 5-8, and 9-12 providing for flexibility in local curriculum programming K-12 and for specific course development leading to the attainment of standards as measured by formative, summative, and common state assessments.</p>	<p>Rating: 1 2 3 4</p> <p>Evidence: Arrangements of PE by topic areas or DCI provide various pathways to address curriculum programming and instructional practices for the teaching and learning of science K-12.</p> <p>Assessment is outlined by grade level performance expectations as determined by assessment boundaries identified K-12.</p>
Coherence			
<ul style="list-style-type: none"> Connections between content, concepts and practices 	<p>Relevant practices (habits of mind – thinking and doing STEM) develop deeper conceptual understanding of science content P-12.</p>	<p>Rating: 1 2 3 4</p> <p>Evidence: Standards, KI, PI, and MU are provided for grade bands at K-4, 5-8 and 9-12. The core curriculum resource guides are discipline specific at 9-12. Connections among Std 1, 2, 6, & 7 with Std 4 are not articulated.</p>	<p>Rating: 1 2 3 4</p> <p>Evidence: Each PE includes a science and engineering practice (SEP), a DCI, and a crosscutting concept (CCC). Some of the connections appear to be forced.</p> <p>Performance expectations are arranged by topic areas and by DCI (Framework) within life science, physical science, and Earth and space science K-12.</p> <p>Appendices provide additional supports that address the connection among SEP, DCI, and CCC.</p>

Next Steps

- This summer, Department staff will summarize the evaluation results gathered from various stakeholder groups and the public survey and highlight key differences between both sets of full standards.
- In September, Department staff will present a formal recommendation to the Board regarding the possible adoption of the Next Generation Science Standards and strategic plan for implementation.