



**TO:** P-12 Education Committee  
**FROM:** Angelica Infante-Green *A. Infante - Green*  
**SUBJECT:** New York P-12 Science Learning Standards  
**DATE:** December 1, 2016  
**AUTHORIZATION(S):** *Margellen Eis*

### SUMMARY

#### **Issue for Decision**

Will the Board of Regents approve the proposed New York State P-12 Science Learning Standards currently under consideration for implementation in all schools beginning July 1, 2017?

#### **Proposed Handling**

This issue will be before the Regents P-12 Education Committee for recommendation and to the Full Board for approval at the December 2016 meeting.

#### **Background Information**

Department staff in collaboration with various stakeholders in science education across the state has engaged in a multi-tier process over several years (2010-2016) to develop New York State P-12 Science Learning Standards (NYSP-12SLS) currently under consideration by Board of Regents, June 2016:

<http://www.p12.nysed.gov/ciai/mst/sci/documents/BoR-ConsiderationNYS%20P-12-ScienceLearningStandards.pdf>

The **Statewide Leadership Team, Science Education Steering Committee, and Science Education Consortium** (Appendix A) have served in a formal advisory capacity to Department staff throughout the development process. The Department also gleaned important information from two public surveys; summer 2013 compared current state science standards to the NGSS using a set of criteria, and a public survey (opened December 8, 2015-closed February 8, 2016) on the draft NYSP-12SLS based on the same criteria. In conjunction with the three committees, Department staff worked alongside members to analyze quantitative and qualitative survey data and feedback to determine the necessary changes included in the current revised NYSP-12SLS under consideration and posted on the Department's website.

The NYSP-12SLS are based on guiding documents grounded in the most current research in science and scientific learning; and reflect the importance of every student's engagement with natural scientific phenomenon at the nexus of three dimensions of learning; Science and Engineering Practices, Disciplinary Core Ideas, and Cross-cutting concepts; *A Framework for K-12 Science Education* (NRC,2012) and the Next Generation Science Standards (2013).

In the recent 2015 report, *Revisiting the STEM Workforce* by the National Science Board, it is stated that “the STEM workforce is extensive and critical to innovation and competitiveness” and careers in these fields will only grow in the next decade making it essential for accessibility to equitable learning opportunities for all students to benefit. Over the past several decades as well as recently, streams of research studies, reports, policies, and publications also document the under-participation and often limited preparedness of many students across the United States in science, limiting inclusive opportunities to enter into the Science, Technology, Engineering, and Mathematics (STEM) workforce and college pathways. It is in this context that the proposed new state learning standards in science are well positioned to strengthen P-12 science education in our classrooms for all our students.

The development and adoption of these new proposed NYSP-12SLS is significant and an essential first-step in upholding the primary goal, objectives and activities identified in the ‘Standards’ key component section included in the Board of Regents approved Statewide Strategic Plan for Science (January, 2015) at:

<http://www.p12.nysed.gov/ciai/mst/sci/strplan.html> and

<http://www.p12.nysed.gov/ciai/mst/sci/documents/Final-Statewide-Strategic-Plan-for-ScienceRev.pdf>

## **Statewide Strategic Plan for Science**

### **Standards**

**Goal:** Adopt new science learning standards and a 5 year strategic plan.

**Objective:** Direct the review, revision, and adoption process for identifying new P-12 NYS science learning standards.

**Objective:**

Determine the core science content, conceptual understandings, and practices for all students P-12 that develops scientifically literate citizens who are better prepared to pursue college and career pathways.

**Objective:**

Implement and sustain the 5-year strategic plan for transitioning to the new P-12 NYS learning standards.

## Summary Timeline of Major Milestones

### 2010

The National Academy of Sciences' Board on Science Education, a standing Board within the National Research Council (NRC) posted *A Framework for Science Education Practices, Crosscutting Concepts, and Core Ideas* for public review and comment. Department staff participated in a regional meeting with other states' science professionals to collectively develop comments.

### 2011

The Next Generation Science Standards (NGSS) were under development, and based on the release of NRC's *A Framework for Science Education; Practices, Crosscutting Concepts, and Core Ideas*. New York State, along with 25 other states, was selected as a Lead State Partner and provided feedback at two key points in the development process of the NGSS.

### 2012

The National Research Council (2012) published *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*.

### 2013

The final version of the NGSS was released, and derived from the NRC's *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. NYSED posted a public survey to collect feedback from various stakeholders in science education to compare the current NYS Science Learning Standards and the NGSS to specific survey criteria. The quantitative and qualitative feedback collected via this public survey were used in part, to formulate the recommendation to the Board of Regents regarding next steps for the P-12 science teaching and learning in NYS.

### 2014

Department staff provided an update on the development of the Statewide Strategic Plan for Science to the Board of Regents and requested that the Board authorize Department staff to move forward with a process to develop new New York State learning standards in science.

### 2015

The Board of Regents approved the Statewide Strategic Plan for Science available at <http://www.p12.nysed.gov/ciai/mst/sci/strplan.html>, January 2015. The plan was collaboratively developed by the New York State Education Department, members of the Science Content Advisory Panel, the Statewide Leadership Team (Science), and representatives of the NYS Science Education Consortium. Its purpose is to guide a comprehensive approach toward improving P-12 science education statewide, while specifically addressing a mission and vision for science education in NYS that incorporate six critical components simultaneously - Standards, Curriculum, Professional Development to Enhance Instruction, Assessment, Materials and Resource Support, and Administrative and Community Support.

Over the summer of 2015, New York State science educators who are employed by the State Education Department to develop the State's science assessments, prepared a preliminary draft of NYS science learning standards based on the feedback received from the 2013 survey and on other input received from science education stakeholders across the State. This preliminary draft used the structure and architecture of the NGSS as a starting point.

The Science Education Steering Committee members convened at the Education Department; members reviewed the preliminary draft of the science learning standards and provided the Department with recommendations for revisions. These recommendations were considered and incorporated into a new draft.

The Science Standards' Writing Team met to review this new draft. Over the course of the two-day meeting, the team provided the Department with recommendations regarding the draft set of science learning standards. Their recommendations were considered and incorporated, as appropriate, into a third iteration of draft science learning standards that was prepared for public review and comment.

*November 2015:* Draft NYS P-12 Science Learning Standards were posted for public preview.

*December 2015- February 2016:* A public survey to collect feedback related to the draft NYS P-12 Science Learning Standards was posted on the Department's website.

## **2016**

The Science Education Steering Committee convened to analyze the survey data and provided the Department with recommendations regarding the draft NYS P-12 Science Learning Standards.

Additions and revisions are reflected in the new set of NYS P-12 Science Learning Standards based on public survey data and Science Education Steering Committee recommendation.

*June 2016:* New set of New York State P-12 Science Learning Standards presented to the Board of Regents for consideration and posted on the Department's website at <http://www.p12.nysed.gov/ciai/mst/sci/documents/BoR-ConsiderationNYS%20P-12-ScienceLearningStandards.pdf>

### **Related Regents Items**

<http://www.regents.nysed.gov/common/regents/files/616p12d3.pdf>

<http://www.regents.nysed.gov/common/regents/files/316p12d1.pdf>

<http://www.regents.nysed.gov/common/regents/files/115p12a1.pdf>

<http://www.regents.nysed.gov/common/regents/files/1014p12d1.pdf>

<http://www.regents.nysed.gov/common/regents/files/314p12d1%5B3%5D.pdf>

[http://www.regents.nysed.gov/common/regents/files/413p12d3\\_0.pdf](http://www.regents.nysed.gov/common/regents/files/413p12d3_0.pdf)

<http://www.regents.nysed.gov/common/regents/files/documents/meetings/2010Meetings/October2010/1010swd1.pdf>

## **Recommendation**

It is recommended that the Board of Regents take the following action:

VOTED: That the Board of Regents approves the New York State P-12 Science Learning Standards to be implemented in all schools beginning July 1, 2017.

## **Timetable for Implementation**

If approved at the December 2016 meeting, implementation of the new New York State P-12 Science Learning Standards will begin in all schools beginning with the 2017-2018 school year. This will enable Department staff to continue to collaborate with various key stakeholder groups across that state between now and July 1, 2017 to:

- Develop a NYS Comprehensive Science Standards System Implementation Plan that pinpoints 3 phases to address a systemic and systematic transition to new standards aligned to the mission, vision, and all six key components included in the Statewide Strategic Plan for Science; (Standards, Curriculum, Professional Development to Enhance Instruction, Materials & Resource Support, Administrative and Community Support) at distinct levels - local, regional, and state.

Phase I: Initial Transition-Raise Awareness and Capacity Building

Phase II: Transition and Implementation

Phase III: Implementation and Sustainability

- Address any changes necessary to the NYSP-12SLS in conjunction to the revisions made to the NYS mathematics state standards and ELA state standards, approved by Board of Regents;
- Continue to identify STEM assets and initiatives across the state to build a Statewide Science Education Ecosystem Network to support the teaching and learning initiatives in science through collaborations and partnerships with school districts, institutes of higher education, professional organizations, informal science institutions, business and industry, and other science stakeholder groups at the regional and local levels and better utilize the vast established educational infrastructure across the state;
- Target specific State and federal funding sources to signal fiscal resources for use at the local level; ESSA (Title II Part A – Teacher Quality and Title IV – Student Support and enrichment Grants - STEM ) as well as possible grant opportunities to support the implementation of the Statewide Strategic Plan for Science at the regional and state levels.

Appendix A –

Members of the New York’s Statewide Science Leadership and Advisory Groups

Science Education Steering Committee (SESC) – convened by SED to provide advice regarding the implementation of the Statewide Strategic Plan for Science 2016	
Name	Organization
Kristen Ames	Canton CSD
Sheila Appel	IBM
Celeste Barker	Schroon Lake CSD
Kelly Baudo	Buffalo Public Schools
Michael Chan	Rochester CSD
Natasha Cooke-Nieves	American Museum of Natural History
Kenneth Huff	Williamsville CSD
Karen Huffman-Kelly	Genesee Community College
Krista Hunter	Syracuse CSD
Diane Irwin	Ballston Spa CSD
Michael Jabot	SUNY Fredonia
Okhee Lee	NYU
Laura Lehtonen	Capital Region BOCES
Jason Lindley	Pelham UFSD
Mary Loesing	Connetquot CSD
Denise McNamara	NYC DOE
Timothy Newton	Union-Endicott CSD
Kate Perry	Robert C. Parker School
Lisa Perry	Yonkers Public Schools
Ann Rivet-Stanley	Columbia University
Doug Schmid	Western Suffolk BOCES
Susan Sciglibaglio	Bethpage UFSD
Kathy Southwell	East Syracuse Minoa CSD
Bruce Tulloch	NYS Science Education Consortium
Mark Vaughn	Corning Incorporated

<p style="text-align: center;"><b>NYS Science Education Consortium</b>  <i>convened by consortium; combination of leaders from the 16 regional sections of STANYS and teacher professional organizations across the state 2013-2016</i></p>	
Name	Organization
John Augenstein	Science Council of New York City
Jackie Carrese/Jenn Gonyea	Capital Area Science Supervisors Association
Lisa Broderick	Science Teachers Association of New York State
Keith Bogert	Science Teachers Association of New York State
John Cunninham	Science Council of New York City
Connie Duff	New York State Science Education Leadership Association
Steve Fielman	Science Teachers Association of New York State
Fran Hess/ Glen Conchrane	Science Teachers Association of New York State
Kathy Hoppe	Science Teachers Association of New York State
Mary Loesing/Joyce Barry	Long Island Science Education Leadership Association
Linda Padwa/Elaine Jetty	Biology-Chemistry Professional Development Network
Bill Ottman	Greater Rochester Area Consortium
Fred Pidgeon	Science Teachers Association of New York State
Patricia Price	Higher Education Representative
Arnie Serotsky	Science Teachers Association of New York State, Co-
Doug Schmid/ Laura Lehtonen	BOCES Representatives
Mary Thomas	Science Teachers Association of New York State
Bruce Tulloch	Facilitator
Brian Vorwald	Science Teachers Association of New York State

<p style="text-align: center;"><b>Science Content Advisory Panel (SCAP) - 2013</b>  <i>convened by SED; advises on the revision and implementation of NYS science learning standards</i></p>	
Name	Organization
Lawrence R. Aaronson	Utica College
Marie Anderson	Kingston City School District
Jennifer Baxter	Palmyra-Macedon Central School District
Fernando Espinoza	SUNY Old Westbury
Karen Harris	Schodack City School District
Karen Huffman-Kelly	Genessee Community College
David Kanter	New York Hall of Science
Denise McNamara	NYC Department of Education
William Panaram	NYC Department of Education
Kate Perry	Robert C. Parker School
Shane Price	Lyndonville Central School District
Ann Rivet	Columbia University
Susan Scigliabaglio	Bethpage Union Free School District
Mark Vaughn	Corning Incorporated
Linda Weinberg	SUNY Delhi

Statewide Leadership Team (SLT) - convened by SED; provided feedback to Achieve at various stages of NGSS 2011-2013

Name	Organization
Sheila Appel	IBM
Margaret Ashida	Battelle/STEMx
Kelly Baudo	Buffalo Public Schools
Nicole Bobel	Buffalo Public Schools
Greg Borman	CUNY
Michael Carpenter	SUNY Albany Colleges of Nanoscale Science and Engineering
Jackie Carrese	Capital Area Science Supervisors Association
Michael Chan	Rochester City School District
Natasha Cooke-Nieves	American Museum of Natural History
Linda Curtis-Bey	NYC Department of Education
Joseph Dragone	Ballston Spa Central School District
Kim Drake Hyland	Guilderland Central School District
Don Duggan-Haas	Paleontological Research Institution
Linda Gentiluomo	Schenectady City School District
Kristen Huff	Regents Research Fund
Odalys Igneri	NYC Department of Education
Michael Jabot	SUNY Fredonia
David Kanter	New York Hall of Science
Anu Malipatil	Regents Research Fund
David Marmor	NYC Department of Education
Judy Mayer	Yonkers Public Schools
Denise McNamara	NYC Department of Education
Julie Nucci	Cornell University
William Ottman	Syracuse City School District
Fred Pidgeon	Science Teachers Association of New York State
Charlene Rydgren	Malone Central School District
Thomas Shiland	Saratoga Springs City School District
Jan Stark	Port Jervis City School District
Henry Strada	NYS Technology and Engineering Educators Association
Mark Vaughn	Corning Incorporated
Chuck Ver Straeten	New York State Museum/Geological Survey
Brian Vorwald	Science Teachers Association of New York State
Judy Wegman	Brighton Central School District
Ken White	Brookhaven National Laboratory
Kathy Wronski	Lyndonville Central School District