



Science Standards and Curriculum Update

Board of Education Workshop

April 4, 2017



Standards Update

- New York State Education Department adopted new Science standards – the New York State Science Learning Standards (NYSSLs) in December 2016
- With adoption, NYSED developed 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
- **Partnership with our PNWBOCES has allowed us to engage this implementation plan beginning with Phase I – beginning the transition from the previous standards**



What's *New* in the New York State Science Learning Standards (NYSSLs)?

- **“3 Dimensional Learning”**
- Utilization of performance expectations as opposed to discrete fact nuggets.
- **K-12 content and skill progressions; these are foundational to utilizing standards**
- Elementary grade by grade expectations
- Secondary topic arrangement (“who owns what” will need to be determined)
- **Engineering is both integrated and existent in own right.**
- **Aligned to Common Core Learning Standards**

**New York State Science Learning Standards
(NYSSLs) Administrator Briefing**
February 15th, 2017
David Jacob and Fred Ende, PNWBOCES



Conceptual and Instructional Shifts

- **Focus**-The NYSSLs are focused on deeper understandings and application of science content in a way that reflects real-world interconnectedness. By limiting key ideas, standards allow for deeper focus on core understandings
- **Science is About Doing** –Standards showcase that science cannot be learned if it cannot be done.
- **Coherence and Integration**-All components of standards build coherently across all dimensions, and developmentally through grades. All grades **MUST** do their part for the progression. In general, all dimensions are integrated. Physical, Earth/Space, Life, all exist together, regardless of “courses.”



The Three Dimensions of Science Learning

- **Scientific and Engineering Practices**
- **Disciplinary Core Ideas**
- **Crosscutting Concepts**

Key Learning Ideas

- Learning challenging concepts develops over time
- K-12 progressions for all three dimensions
- Teachers must integrate all three dimensions in classroom work

+ Dimension 1

Scientific And Engineering Practices (SEP)

Asking questions (science) and defining problems (engineering)	Using mathematics and computational thinking
Developing and using models	Constructing explanations (science) & designing solutions (engineering)
Planning and carrying out investigations	Engaging in argument from evidence
Analyzing and interpreting data	Obtaining, evaluating, and communicating information

+ Dimension 2

Disciplinary Core Ideas

What are the CORE IDEAS that students should remember about the science they are doing?

- **Science ideas that are important for the 21st Century (slimmed down)**
- **Big ideas are more important than details**
- **Progressive from K-12**
- **Links between the disciplines of Science (Life Sci, Physical Sci, and Earth/Space Sci)**

+ Dimension 3

Crosscutting Concepts

“Something we learn in one discipline that can be applied to another discipline, or integrated across disciplines. . .”

1. Patterns

2. Cause and effect

3. Scale, proportion, and quantity

4. Systems and system models

5. Energy and matter

6. Structure and function

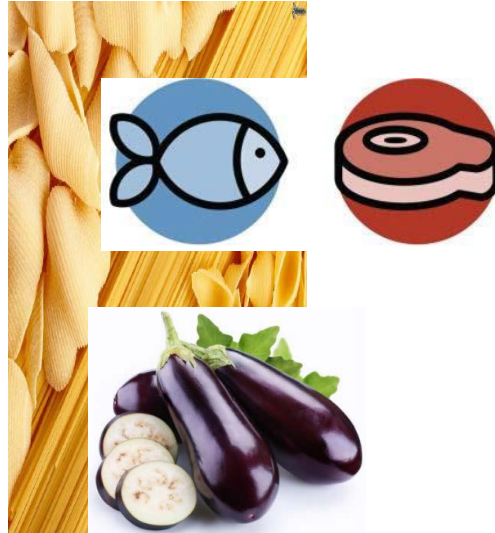
7. Stability and change



ANALOGY: 3D LEARNING AND COOKING



Kitchen Tools &
Techniques
(**Practices**)



Basic Ingredients
(**Core Ideas**)



Vegetables, Herbs and
Spices (**Crosscutting**)



Preparing a Meal
(**3D Learning**)



How do you prepare your staff for the changes?

ALL teachers need time to unpack the standards, discuss how to approach the instructional shifts, prepare for classroom instruction and design local assessments aligned to new standards and assessments.

Partnership with our **PNWBOCES** will help us join a cohort of teachers and administrators who are also preparing for the transition.



Course Models

The expectations for the new standards are for **ALL** students. Any course can go above the standard and teach at a higher level.

- Course models not needed in elementary since there are clear grade expectations through grade 5
- Middle School science will need to reorganize all units of study to align instruction to progressions in the standards. *The expectations for these grade levels are higher than current standards and teachers may need more extensive content knowledge.*
- High School science will break down the Performance Expectations by Regents exams. Physical Science will need to break into Chemistry and Physics. The expectations for these grade levels are DIFFERENT than current standards and teachers will need to re-evaluate WHAT and HOW they are teaching.



Proposed Timeline (as of June 6, 2016)

2016-2017—build **awareness** of the new standards across the state and develop assessment frameworks.

2017-2018—build capacity with the standards, **implement** local curriculum and develop prototyped assessment tasks

2018-2019—**continue** local **implementation** of curriculum and assessment development to focus on item writing and ancillary test development.

2019-2020 —**assessment development** focus on final item writing. Question sampler and public information on assessment framework to be released on Grade 5 and 8 exams.

2020-2021—**earliest possible administration of state-level Grade 5 & 8** state-level science assessment based on NYS P-12 Science Learning Standards. Field testing of Regents Exam items begins.

2021-2022—**earliest possible administration of state-level Regents Exams** based on the NYS P-12 Science Learning Standards. Assessment development continues



Science 21



- **SCIENCE 21** is an integrated K-6 science curriculum developed locally and regionally at the Putnam/Northern Westchester BOCES.
- It is a science program designed by teachers for teachers. **It is linked to the *New York State Learning Standards for Mathematics, Science and Technology*.**
- The program's major emphasis is on investigations that are student directed and relevant to students' everyday lives. The program's main focus is on hands-on, inquiry-based science.

Teachers are currently involved in a rotation of revision by grade level to fully align the Science 21 Curriculum to the NYSSLs.



Secondary Science

Middle School:

NYSSLS may require a shift away from Earth Science in Middle School to allow for content to be developed at a deeper level.

High School:

Multiple pathways to allow for exploration of interest at a deep level. These explorations are made possible because of the depth of content knowledge developed at the middle level.



Pathways and Engineering

■ Current:

- 4-year PLTW engineering pathway
- IB science options start 17-18 school year
- Science Research in conjunctions with conventional courses.

■ Future:

- Additional PLTW engineering Pathway in Biomedical Engineering
- Course development for pathways in Life or Physical sciences.