



K-12 Science Update:

Preparation for Next Generation Science Standards

November 6, 2017



Overview

WHY

is science
education
changing?

WHAT

are the Next
Generation
Science
Standards?

HOW

is SPS
transitioning
to the NGSS?

Our conversation about science today will focus on answering these key questions.

A New Vision for Science Education

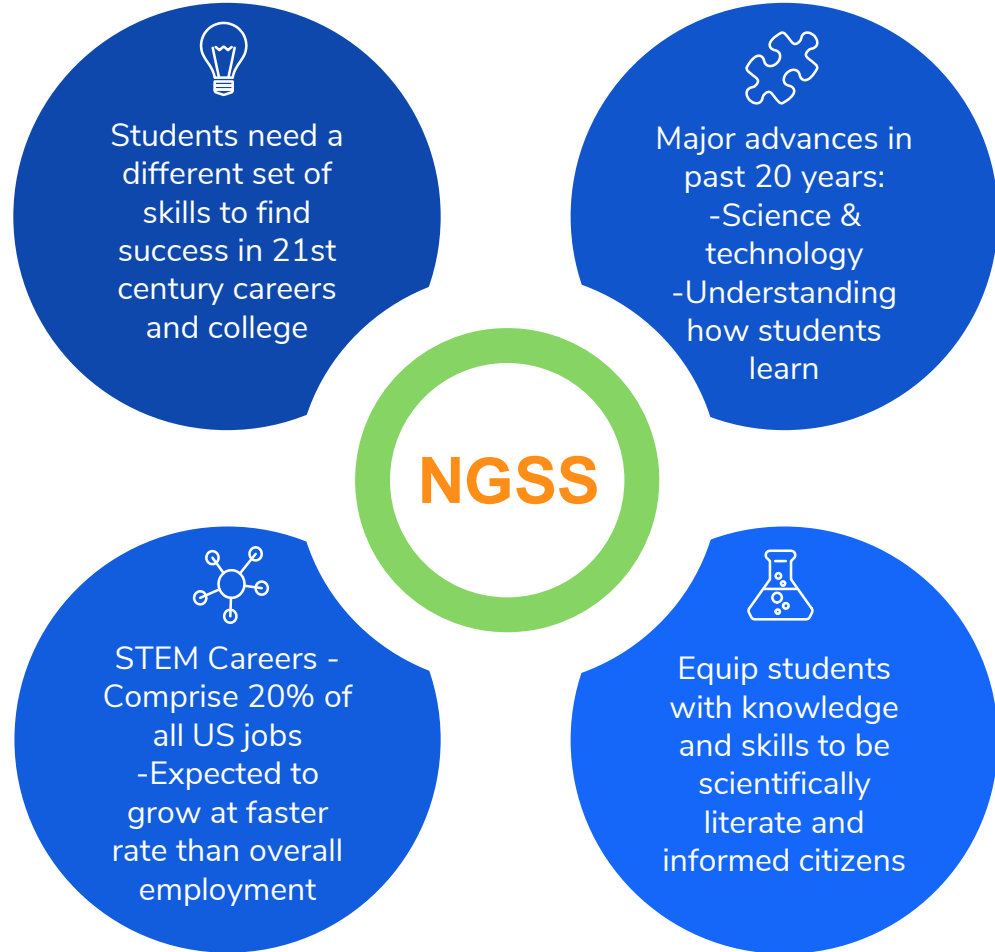
Implications of the Vision of the Framework for K-12
Science Education and the Next Generation Science Standards

SCIENCE EDUCATION WILL INVOLVE LESS:	SCIENCE EDUCATION WILL INVOLVE MORE:
Rote memorization of facts and terminology	Facts and terminology learned as needed while developing explanations and designing solutions supported by evidence-based arguments and reasoning.
Learning of ideas disconnected from questions about phenomena	Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned
Teachers providing information to the whole class	Students conducting investigations, solving problems, and engaging in discussions with teachers' guidance
Teachers posing questions with only one right answer	Students discussing open-ended questions that focus on the strength of the evidence used to generate claims
Students reading textbooks and answering questions at the end of the chapter	Students reading multiple sources, including science-related magazine and journal articles and web-based resources; students developing summaries of information.
Pre-planned outcome for "cookbook" laboratories or hands-on activities	Multiple investigations driven by students' questions with a range of possible outcomes that collectively lead to a deep understanding of established core scientific ideas
Worksheets	Student writing of journals, reports, posters, and media presentations that explain and argue
Oversimplification of activities for students who are perceived to be less able to do science and engineering	Provision of supports so that all students can engage in sophisticated science and engineering practices

Source: National Research Council. (2015). *Guide to Implementing the Next Generation Science Standards* (pp. 8-9). Washington, DC: National Academies Press. <http://www.nap.edu/catalog/18802/guide-to-implementing-the-next-generation-science-standards>



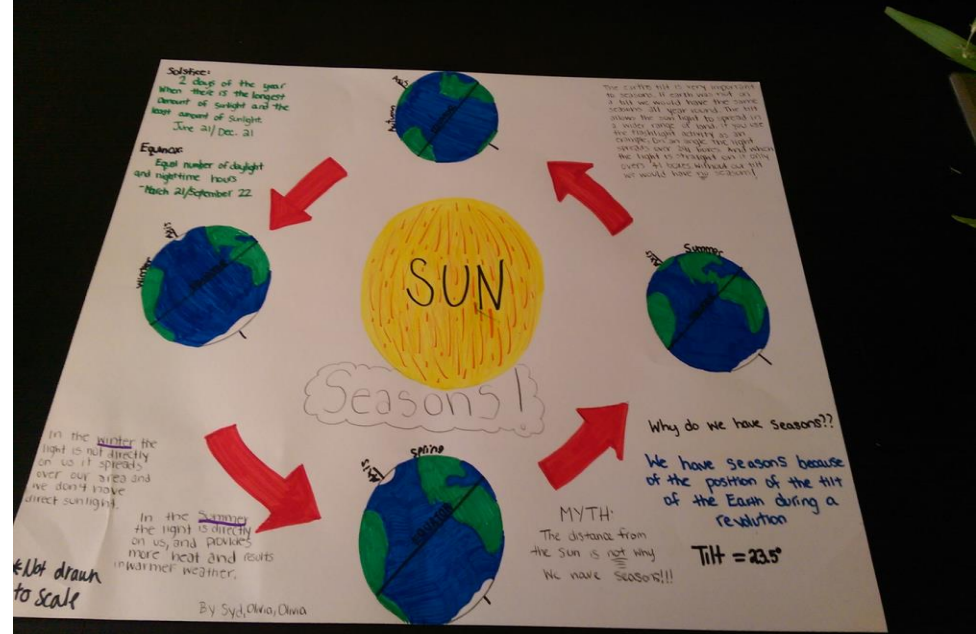
WHY the Need for New Science Standards?



WHAT will an NGSS Classroom Look Like?

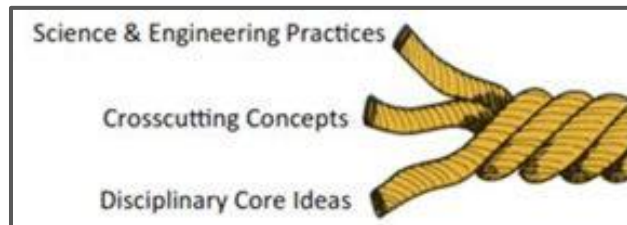
“a hands-on, collaborative, and integrated environment rooted in inquiry and discovery”

Units anchored to a scientific phenomenon that drives instruction throughout the unit.



Learning in 3-D

Scientific and Engineering Practices		Crosscutting Concepts	
<ol style="list-style-type: none"> Asking Questions and Defining Problems Developing and Using Models Planning and Carrying Out Investigations Analyzing and Interpreting Data Using Mathematics and Computational Thinking Constructing Explanations and Designing Solutions Engaging in Argument from Evidence Obtaining, Evaluating, and Communicating Information 		<ol style="list-style-type: none"> Patterns Cause and Effect Scale, Proportion, and Quantity Systems and System Models Energy and Matter Structure and Function Stability and Change Interdependence of Science, Engineering, and Technology Influence of Engineering, Technology, and Science on Society and the Natural World 	
Disciplinary Core Ideas			
<i>Physical Sciences</i>	<i>Life Sciences</i>	<i>Earth and Space Sciences</i>	<i>Engineering, Technology, and the Applications of Science</i>
<p>PS 1: Matter and its interactions</p> <p>PS 2: Motion and stability: Forces and interactions</p> <p>PS 3: Energy</p> <p>PS 4: Waves and their applications in technologies for information transfer</p>	<p>LS 1: From molecules to organisms: Structures and processes</p> <p>LS 2: Ecosystems: Interactions, energy, and dynamics</p> <p>LS 3: Heredity: Inheritance and variation of traits</p> <p>LS 4: Biological evolution: Unity and diversity</p>	<p>ESS 1: Earth's place in the universe</p> <p>ESS 2: Earth's systems</p> <p>ESS 3: Earth and human activity</p>	<p>ETS 1: Engineering design</p> <p>ETS 2: Links among engineering, technology, science, and society</p>



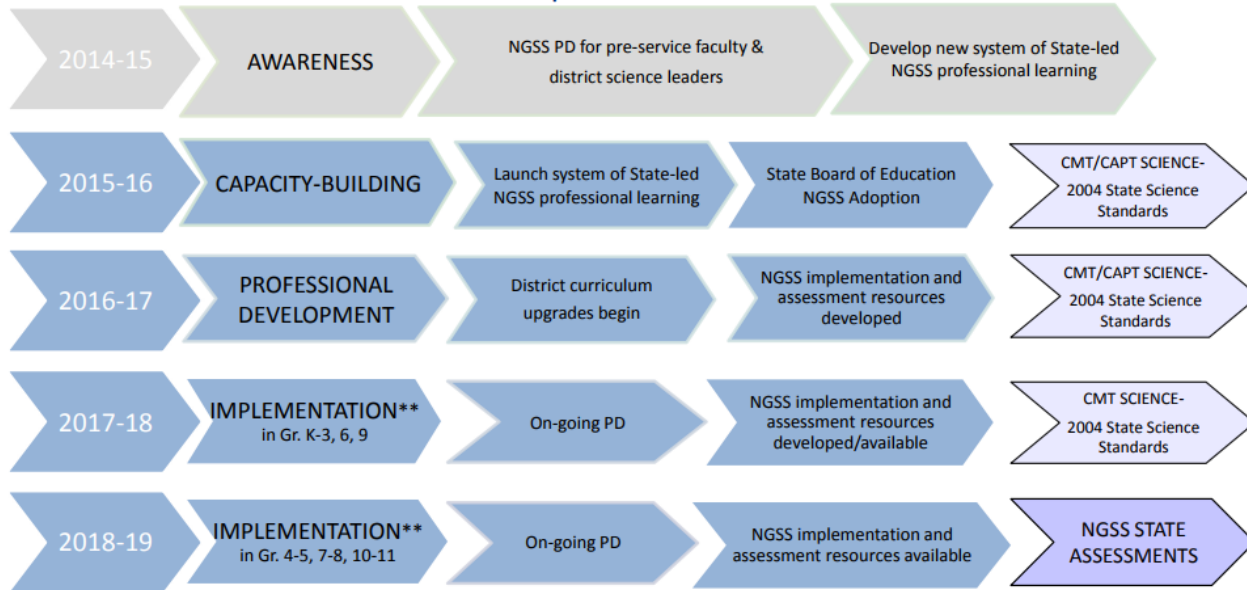


LESS OF THIS	MORE OF THIS
Students learn about science	Students do science and engineer solutions
Rote memorization of facts and terminology	Facts and terminology learned as needed while developing explanations and solutions
Teachers provides information to whole class	Students conduct inquiry-based investigations, solve problems, and engage in discussions
Teachers pose questions with only one right answer	Students discuss open-ended questions that focus on strength of evidence
Students read textbooks and answer questions at the end of the chapter	Students read and synthesize information from multiple sources
“Cookbook” labs tell students what to do	Investigations driven by students’ questions that lead to a deep understanding of core ideas

Connecticut's NGSS Implementation Plan

DRAFT* 5-Year NGSS Implementation Timeline

September 2017



** An option for transitioning away from current state standards to teaching NGSS.

Districts have flexibility to develop their own transition and implementation plans.



Preparation and Transition Year

2016
-
2017

6th/9th Grade Formal Implementation

2017
-
2018

K-12 Formal Implementation

2018
-
2019

Curriculum Revisions

2019
-
2020

KEY EVENTS

Middle School courses undergo scope and sequence development and revision

Development of NGSS Implementation Timeline

District-wide minimum content and instructional shifts are implemented regarding SEPs

Curriculum development in grades K-3, 6, 9

Revision and input of course curriculum into Rubicon Atlas

State Field Assessment

KEY EVENTS

6th and 9th Grade formally implements integrated model

4th, 5th, 7th, 8th, 10th, 11th Grade Science curriculum development to reflect integrated model

Additional district-wide instructional shifts professional development are implemented

Curricular assessment/instructional resources developed

State Pilot Test

KEY EVENTS

All grades formally implement integrated model

Additional district-wide instructional shifts professional development are implemented

Curricular assessment/instructional resources developed

State Operational Assessment (1st year)

KEY EVENTS

Grades K-12 continue to implement integrated model

Additional district-wide instructional shifts professional development are implemented

Revision of curricular resources and alignment of GBE benchmark assessments.

State Operational Assessment (2nd year)

*Note that this is a tentative timeline, and reflects updates from Fall 2017 CREC Science Council Meeting and revised state timeline

Suffield's NGSS Implementation Plan - Revised DRAFT

(K-3 Excerpt taken from K-12 Implementation Timeline)



Overview of Suffield Schools Science Curriculum Process - K-12 Implementation Timeline

The revised science curriculum will follow the [thematic model](#) published on the NGSS website for grades K-5. Grades 6-8 will follow the [topics model](#) published on the NGSS website, this course sequence is aligned to California's integrated approach. The proposed plan is aligned to the Connecticut Department of Education [Timeline for Curriculum Revision and Transition](#) (2014).

K-5 Implementation Timeline :

Grades K-5	2016-17	2017-18 <i>*NGSS Field Test Assessment</i>	2018-19 <i>**NGSS Assessment Yr. 1</i>	2019-2020
Kindergarten	Curriculum Development	Assessment Development	<ul style="list-style-type: none"> Unit Rollout Orientation Articulation in Rubicon Full Implementation 	<ul style="list-style-type: none"> Revision Continued Implementation
Grade 1	Curriculum Development	Assessment Development	<ul style="list-style-type: none"> Unit Rollout Orientation Articulation in Rubicon Full Implementation 	<ul style="list-style-type: none"> Revision Continued Implementation
Grade 2	Curriculum Development	Assessment Development	<ul style="list-style-type: none"> Unit Rollout Orientation Articulation in Rubicon Full Implementation 	<ul style="list-style-type: none"> Revision Continued Implementation
Grade 3	Curriculum Development	Assessment Development	<ul style="list-style-type: none"> Unit Rollout Orientation Articulation in Rubicon Full Implementation 	<ul style="list-style-type: none"> Revision Continued Implementation