The Next Generation Science Standards (NGSS) and Inclusion

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SMCOE Goal

SMCOE will actively work to erase San Mateo County’s Achievement Gap by working with teachers, leaders, and systems to insure every student has access to academically rigorous, culturally responsive instruction and to a support system that fosters academic success.

We will do this in today’s session by…
SMCOE Goal

• Deepening participants’ understanding of the College and Career-oriented Next Generation Science Standards in order to discuss strategies for effectively scaffolding and differentiating instruction so that all students access these new standards

• Providing opportunities to discuss strategies for making the NGSS accessible to students with disabilities

• Understanding how the NGSS can be integrated across other content areas, leading to STEM education for all students
Agenda

- Assessing Background Knowledge
- Adoption Timeline
- NRC Framework for K-12 Science Education
- Three Dimensions of the Next Generation Science Standards (NGSS)
- The Structure and Cognitive Shifts of the NGSS
- Making the NGSS accessible to all students
Where are we?

1. How would you describe your knowledge or implementation level with the Common Core State Standards (CCSS) in your science program?

2. How would you describe your knowledge of the National Research Council’s K-12 Science Framework?

3. How would you describe your knowledge or implementation level of the Next Generation Science Standards in your science class?
Next Generation Science Standards

2011
Design Phase

Step 1: Vision for Science

2012

Step 2: Develop NGSS

2013
Awareness Phase

State Adoption of NGSS

2014

Begin CA Science Framework

Middle School Sequence
Next Generation Science Standards

2015 → 2016 → 2017

Awareness Phase

California Science Framework
the details about HOW to teach NGSS in CA Finished Jan 2016

Implementation Phase

DON'T PANIC!

Assessments
Curricula
Teacher Development

iMSS.org, NSF, National Geographic, NASA, Santa Clara County Office of Education
Next Generation Science Standards

Three Dimensions

Dimension 1: Science and Engineering Practices

The practices describe behaviors that scientists engage in as they investigate and build models and theories about the natural world.

Dimension 2: Crosscutting Concepts

They are a way of linking the different domains in science.

Dimension 3: Disciplinary Core Ideas

Describes core ideas in the science disciplines and of the relationships among science, engineering, and technology.
Dimension 1: Science and Engineering Practices

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information
Dimension 2: Crosscutting Concepts

- Patterns, similarity, and diversity
- Cause and effect
- Scale, proportional and quantity
- Systems and system models
- Energy and matter
- Structure and function
- Stability and change
Dimension 3: Disciplinary Core Ideas

- Physical sciences
- Life sciences
- Earth and space sciences
- Engineering, technology and application of science
Disciplinary Core Idea (DCI): Physical Sciences

- PS1. Matter and Its Interactions
- PS2. Motion and Stability
- PS3. Energy
- PS4. Waves and Their Applications
DCI: Life Sciences

• LS1. From Molecules to Organisms: Structures and Processes

• LS2. Ecosystems: Interactions, Energy, and Dynamics

• LS3. Heredity: Inheritance and Variation of Traits

• LS4. Biological Evolution: Unity and Diversity
DCI: Earth and Space Sciences

• ESS1. Earth’s Place in the Universe

• ESS2. Earth’s Systems

• ESS3. Earth and Human Activity
DCI: Engineering, Technology and Applications of Science

• ETS1. Engineering Design

• ETS2. Links among Engineering, Technology, Science and Society
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. NGSS focuses on enduring Disciplinary Core Ideas, rather than isolated science facts

4. The science concepts build coherently from K-12
Conceptual Shifts

5. The NGSS focus on deeper understanding of content as well as application of content

6. Science and Engineering are integrated in the NGSS from K-12

7. The NGSS are designed to prepare students for college, career, and citizenship

8. The NGSS and Common Core State Standards are aligned
NGSS Shifts

What are the implications of these shifts for curriculum and instruction for students with disabilities?
DCI Progressions

Progression are written in grade bands

K-2
Grades 3-5
Grades 6-8
Grades 9-12

Table Activity

1. Examine the Earth and Space, Life Science, or Physical Science DCI for your grade band
2. Discuss the implications of these performance standards for all students
Effective Strategies

Value and respect the experiences that all students bring from their background – make diversity visible

Articulate students’ background knowledge or “funds of knowledge” (Gonzalez, Moll, & Amanti, 2005)

Offer sufficient school resources to support student learning

Chapter 11, NRC A Framework for K-12 Science education
Effective Strategies

What other strategies or support will help students with special needs access the rigorous performance expectations of the Next Generation Science Standards?
Common Ideas/Talking Points

1. Plan intentionally with student needs first and a deep knowledge of the standards to inform that planning

2. Teachers have permission to think and plan deeply about this complex work – it IS rocket science, so take the time to collaborate and plan for differentiation and scaffolding

3. Complex and close reading/text & math content/practices are raising two rigorous cognitive bars simultaneously, so this is hard, but critical work for teachers
Differentiation Activity

• Use Appendix E – Progressions, to plan a differentiated lesson. Choose one of the Disciplinary Core Ideas for Earth and Space Sciences for your grade level band

• Work as a team to revise a lesson, or create a new lesson, that will allow access for all students in your class including the 4 imaginary students with diverse needs

• Be prepared to share out with whole group