SAN DIEGUITO UNION HIGH SCHOOL DISTRICT
BOARD OF TRUSTEES

BOARD WORKSHOP

THURSDAY, OCTOBER 15, 2015
5:00 PM

DISTRICT OFFICE BOARD ROOM 101
710 ENCINITAS BLVD., ENCINITAS, CA. 92024

The Governing Board of the San Dieguito Union High School District held a Board Workshop on Thursday, October 15, 2015, at the above location.

Attendance / Board:
Joyce Dalessandro
Beth Hergesheimer
Amy Herman
Maureen "Mo" Muir (Absent)
John Salazar

Attendance / District Management:
Rick Schmitt, Superintendent
Eric Dill, Associate Superintendent, Business Services
Mike Grove, Ed.D., Associate Superintendent, Educational Services
Torrie Norton, Associate Superintendent, Human Resources
Jason Viloria, Ed.D., Associate Superintendent, Administrative Services
Jennifer McCluan, Science ToSA
Samantha Thacker, Ed.D., District Coordinator of Science Department
Joann Schultz, Executive Assistant to the Superintendent / Recording Secretary

1. CALL TO ORDER
   President Hergesheimer called the meeting to order at 5:00 PM.

2. PUBLIC COMMENTS
   No comments were presented.

INFORMATION ITEMS

3. STUDENT LEARNING

   A. NEXT GENERATION SCIENCE STANDARDS (NGSS)

   Dr. Grove gave an update on the transition to new state standards for Next Generation Science Standards. Dr. Grove introduced Jennifer McCluan, Science ToSA, and Samantha Thacker, District Coordinator of Science Department, who presented on the NGSS, district science goals, key instructional shifts, 3 dimensional learning, and integrating the three dimensions, *as distributed at the meeting and attached to the minutes*. Ms. McCluan and Dr. Thacker led the group in a sample NGSS mini-lesson exercise (*available for review in the Superintendent's Office*).

   B. OTHER STANDARDS

   Dr. Grove gave an update on status of transition to new state standards for English, math and science.

4. ADJOURNMENT

   The meeting was adjourned at 6:02 PM.

John Salazar, Board Clerk — Date: 11/12/15

Rick Schmitt, Superintendent — Date: 11/12/15

Approved at the November 12, 2015 SDUHSD Board of Trustees Meeting
Joann Schultz, Recording Secretary

Science & NGSS

SDUHSD School Board Presentation
October 15, 2015

Michael Grove
Jennifer McCluan
Samantha Thacker

Outcomes

- Awareness of district-wide science goals, implications of Next Generation Science Standards (NGSS) for middle and high school course sequences, and timeframe for implementation
- Understanding of how science learning is different by experiencing an NGSS-aligned mini-lesson
- Familiarization with NGSS implications for teaching and learning and key instructional shifts

District Goals

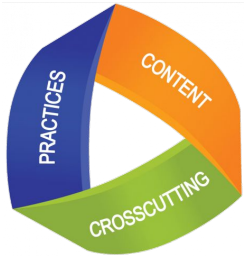
- Continue our transition to new state standards (CCSS, NGSS, Social Studies, English, etc.)
- Each teacher will understand what 21st-century teaching and learning look like in in their subject area and will begin aligning instructional and assessment strategies to include 21st century teaching and learning
- Every teacher will understand key aspects of the new ELD standards and will utilize appropriate instructional and assessment strategies to support language development in their classroom.
- Utilize the formative/PLC process to improve student learning
  - ELO's reflect appropriate content/skills (Standards, 21st Century T&L, etc.)
  - Appropriate site-based common assessments aligned to ELO's
  - Focused & productive PLC discussions focused on evidence of student learning (assessment results)

District Science Goals

- Make a recommendation to the School Board about middle-school and high-school course sequences.
- All teachers will collaboratively implement a 5E NGSS-aligned instructional sequence.
- All teachers will learn about the new ELD standards and framework and will begin to incorporate science language development strategies that support all learners.
- All teachers will participate effectively in PLCs, and groups will deliver a common authentic assessment and examine student work.

NGSS Overview

- Next Generation Science Standards (NGSS) were adopted by California in September 2013
  - They describe the key scientific ideas and practices that all students should learn by the time they graduate from high school
  - Emphasize the importance of having a deep understanding of science concepts and engaging in scientific thinking and practices.
- Integrated vs. Domain-Specific Course Models
  - Implications for middle and high school course sequences
- Timeframe for Implementation
  - Curriculum/Course Implementation (Fall 2017)
  - Assessments Anticipated (Spring 2019)



NGSS Mini-Lesson

In this “Bird Beaks and Survival” task, you will:

- Make a prediction on your own that answers the question, “Which beak type will pick up the most different kinds of food?”
- Design and conduct an investigation to answer this question
- Use models to represent bird beaks and foods that birds eat in nature
- Collect and record your data with your partner(s)
- Record your data and observations in a table
- Graph your data
- Analyze your results
- Draw conclusions using evidence

Instructions and Student Response Sheets (Pages 6-10)

Adapted from Vermont Agency of Education and New England Common Assessment Program

Bird Beak Debrief

Questions to Consider

- How is this type of science learning different than what our students (and we) have experienced?
- How might this topic have been taught/covered in the past?
- How does this performance task differ from the assessments aligned to the previous California Science Standards?

Insect

Worm

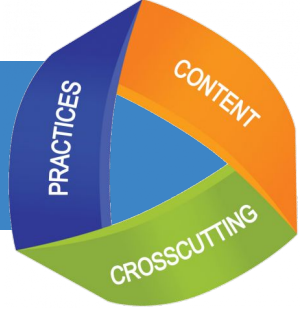
Plant

Attachment to
10-15-15 BWS Minutes

KEY INSTRUCTIONAL SHIFTS

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
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, journal articles and web 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 core scientific ideas
Worksheets	Writing of journals, reports, posters, and presentations that explain and argue
Oversimplification for students who are perceived to be less able to do science	Provision of supports so that all students can engage in sophisticated science and engineering practices

3 Dimensional Learning



An Analogy between NGSS and Cooking

Preparing a Meal
(Performance Expectation)

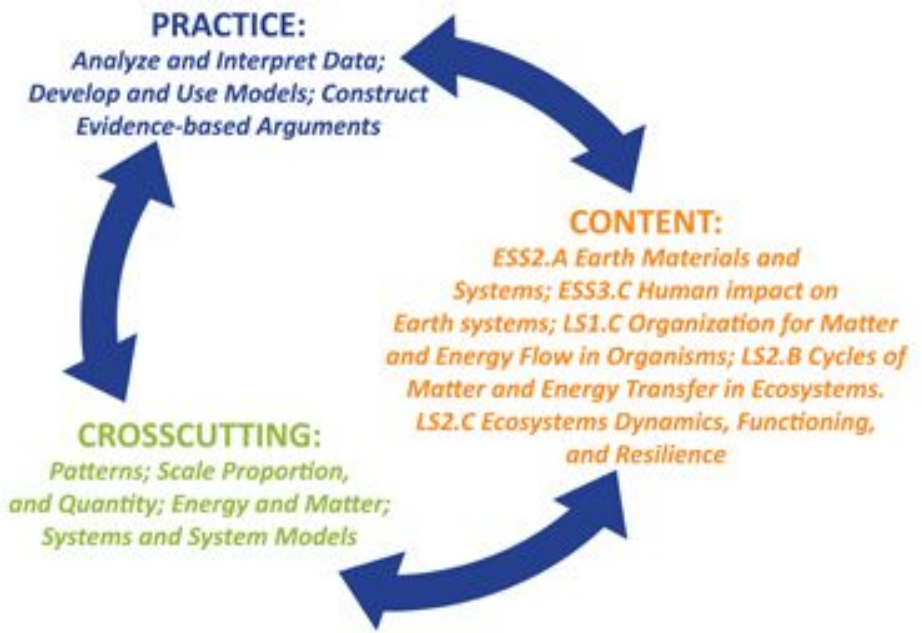
Kitchen Tools & Techniques
(Practices)

Basic Ingredients
(Core Ideas)

Herbs, Spices, & Seasonings
(Crosscutting Concepts)

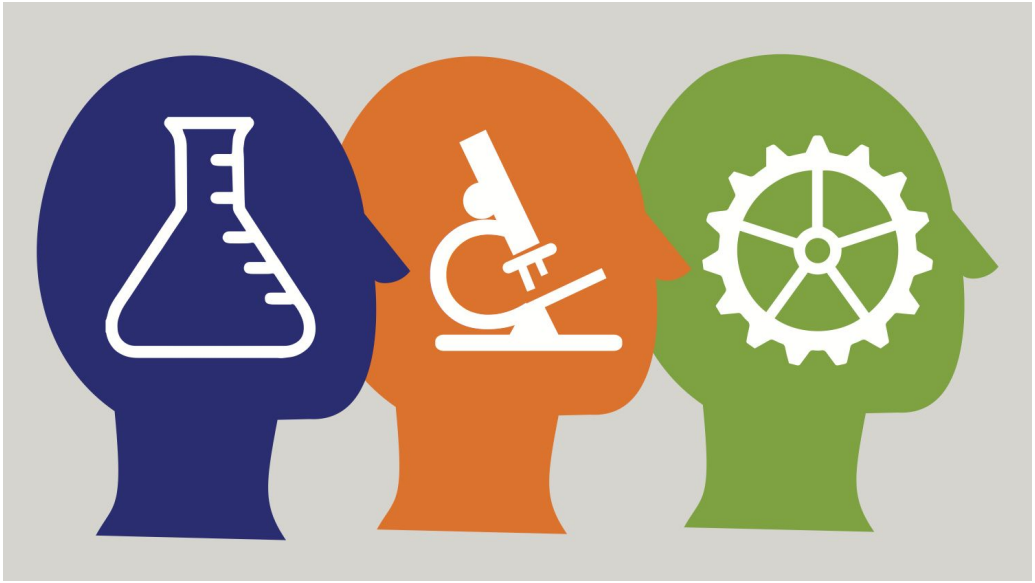
Integrating the Three Dimensions

- NGSS asks students to use scientific practices and crosscutting concepts in order to learn scientific content through the exploration of phenomena
- Rationale is that students must do science in order to learn science
- Using the NGSS Summary Page, identify each of the following used during the Bird Beak Activity
  - Science and Engineering Practices
  - Disciplinary Core Ideas
  - Cross Cutting Concepts



Thank You!

- What remaining questions do you have?



Attachment to
10-15-15 BWS Minutes

How will science education change with NGSS?

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.
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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

Next Generation Science Standards (NGSS)

What does it mean to be proficient in science? How can K-12 education better prepare students to become scientists and engineers? NGSS is a nation-wide effort to answer these questions by defining key elements of science and describing progressive steps that will help students grow in their capacity to do science. NGSS is based on a framework that breaks science down into three dimensions:

Crosscutting Themes

People that study rocks think about different types of scientific problems than people that study plants, but there are some ideas that are important to all sciences – for example, all material is made up of matter and changes to that matter involve the flow of energy. NGSS calls ideas that occur in all sciences "crosscutting themes" and argues that we should explicitly teach them so that students can better spot the connections between sciences. The themes are:

- Patterns, similarity, and diversity
- Cause and effect
- Scale, proportion and quantity
- Systems and system models
- Energy and matter
- Structure and function
- Stability and change.

Disciplinary Core Ideas

While the other two dimensions emphasize commonalities, each science does have some fundamental ideas and principles that guide specific thinking in that field. For example, biology has evolution, physics has interactions using forces. These key organizing principles are essential for understanding or investigating more complex ideas and solving problems. Disciplinary ideas are grouped in four familiar domains that match up with traditional science specialties and their corresponding K-12 courses:

- Physical Sciences
- Life Sciences
- Earth & Space Sciences
- Engineering, technology and applications of science.

Science & Engineering Practices

NGSS is based on the principle that children are born investigators that explore and interact with their world. Science and engineering are more than bodies of facts and knowledge, they are names we give to this natural process. These process skills can be cultivated and advanced in K-12 education. In particular, NGSS focuses on eight key activities that describe behaviors scientists engage in as they explore the natural world:

- 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

Although engineering design is similar to scientific inquiry, there are important differences. For example, scientific inquiry involves the formulation of a question that can be answered through investigation, while engineering design involves the formulation of a problem that can be solved through design. Strengthening the engineering aspects of NGSS will clarify for students the relevance of science, technology, engineering and mathematics to everyday life.