



NEXT GENERATION SCIENCE STANDARDS

January 19, 2017

Instructional Services
Governing Board Presentation

A short NGSS Engineering Challenge

Scenario: Homeless people in our community are getting too cold at night during the winter. Design an affordable and portable device that will help keep them warm and safe

The Challenge

□ Criteria

- Must keep person warm, but not too hot, for 6-8 hours at a time
- Must be usable by adults or children
- Must be reusable

□ Constraints

- Must be easy to carry around
- Must be affordable (\$10-20)
- Must not require an energy source

Protocol

- Take 3-5 mins to brainstorm as many ideas as you can
 - Ideas do not have to meet ALL requirements
 - Quantity is important
 - No idea is a bad idea at this stage
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- After brainstorming session take 2 mins. to evaluate ideas
 - Choose top 2 (may combine ideas to make a new one)

Standards addressed by activity...

This activity is a good example of the new engineering and design standards. For example, the upper elementary standards:

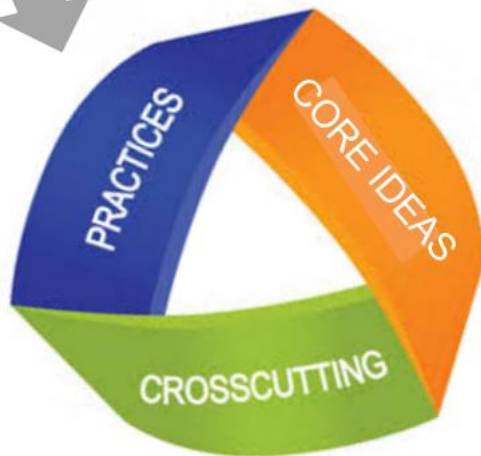
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

The 3 Dimensions of the NGSS



This symbol actually means something!



Science & Engineering Practices
(doing science)

Disciplinary Core Ideas
(facts)

Crosscutting Concepts
(connecting science)



Student Performance Expectation (PE)

Adapted from NSTA

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California Academy of Sciences

Science and Engineering Practices

- 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

Disciplinary Core Ideas

LIFE SCIENCE

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

PHYSICAL SCIENCE

PS1: Matter and Its Interactions

PS2: Motion and Stability: Forces and Interactions

PS3: Energy

PS4: Waves and Their Applications in Technologies for Information Transfer

EARTH AND SPACE SCIENCE

ESS1: Earth's Place in the Universe

ESS2: Earth's Systems

ESS3: Earth and Human Activity

ENGINEERING AND TECHNOLOGY

ETS1: Engineering Design

Cross-Cutting Concepts

- Patterns
- Cause and Effect: Mechanism and Explanation
- Scale, Proportion, and Quantity
- Systems and System Models
- Energy and Matter: Flows, Cycles, and Conservation
- Structure and Function
- Stability and Change

Understanding the NGSS is a Piece of Cake



Performance Expectation

Baking Tools & Techniques



Science & Engineering
Practices

Cake



Disciplinary Core Ideas

Frosting



Crosscutting Concepts

Adapted from NSTA

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California Academy of Sciences

2015 - 2016

Awareness Year

- Lawrence Hall of Science Units
- Equity Coaches Training
- Learning Circles
- Some Middle School Teachers Collaborated on Units
- Introduction to Engineering Practices
- Middle School Teachers Elected “Integrated” Approach
- campbellusdngss.weebly.com resource website

2016 - 2017

Transition Year 1

- Next Generation Science Standards (NGSS) Teacher Leaders
- Professional Development
- Project-Based Learning (PBL) Units
- NGSS Framework Approved by state, November 2016
- NGSS Pilot Test in 5th & 8th grades
- Science/Teacher Focus Groups
- [Integration](#) with Math and ELA
- Environmental Educational Initiative (EEI)

2017 - 2018



Transition Year 2

- NGSS Teacher Leaders
- Professional Development
- Examining NGSS Frameworks
- Additional PBL Units
- NGSS Curriculum may be available to pilot

2018 - 2019

Full Implementation?

- NGSS Teacher Leaders
- Professional Development
- NGSS Curriculum may be available to pilot
- NGSS Official Test may be available (Spring 2019)



Comments/Questions

Instructional Services