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STATE OF HAWAI`I
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OFFICE OF THE SUPERINTENDENT

February 2, 2016

TO: The Honorable Patricia Halagao
Chairperson, Student Achievement Committee

FROM: Kathryn S. Matayoshi
Superintendent

SUBJECT: **Committee Action on the Adoption of Next Generation Science Standards ("NGSS")**

1. RECOMMENDATION

It is recommended that the Board of Education (Board) Student Achievement Committee (SAC) approve the Next Generation Science Standards (NGSS).

2. RECOMMENDED EFFECTIVE DATE

Upon approval by the full Board.

3. RECOMMENDED COMPLIANCE DATE (if different from the effective date)

It is recommended that compliance with full Board approval (i.e. classroom implementation of the NGSS) be effective over a four year period beginning with school year 2016-2017 based on an implementation plan to be presented to the Board at a later date.

4. DISCUSSION

a. Conditions leading to the recommendation

Twenty-six (26) lead state partners drafted the NGSS based on the National Research Council's *Framework for K–12 Science Education*. The 40-member writing team included experts in elementary school science, middle school science, high school science, students with disabilities, English language acquisition, state level standards and assessment, and workforce development. K–12 teachers played a central role in writing the standards, joined by scientists and engineers, professors of science education, state and district science specialists, and other professionals in science teaching and learning.

The following is the NGSS development timeline:

- July 2011 – Final version of the *Framework for K–12 Education* published.
- Summer 2011 – Lead states and writers identified; writing team begins work.
- Fall 2011 – Draft released to lead states for review.
- Winter 2011 – Writers responded to lead state review.
- Winter 2012 – Draft released to lead states and critical stakeholders for review.
- Spring 2012 – Writers responded to lead state and critical stakeholder review.
- May–June 2012 – First public draft released for review.
- Summer 2012 – Writers responded to first public draft review.
- Fall 2012 – Draft released to lead states and critical stakeholders for review. Writers responded to lead state and critical stakeholder review.
- January 2013 – Second public draft released for review.
- Winter 2013 – Writers responded to second public draft review.
- Winter 2013 – Final draft released to lead states for review.
- April 2013 – NGSS released for adoption; final draft and supporting documents posted at http://www.nextgenscience.org.
- June 2013 – Office of Curriculum, Instruction and Student Support (OCISS) briefs Board SAC on the NGSS.
- August 2014 – OCISS presented NGSS discussion to Board SAC.
- September 2015 – OCISS provided NGSS overview and update to Board SAC.

b. Previous action of the Board and Committee(s) on the same or similar matter.

On May 11, 2010, the Board's Curriculum, Instruction and Student Support Committee recommended the adoption of the draft version of the Common Core State Standards for English Language Arts and Mathematics to the full Board.

On May 20, 2010, the Board adopted the draft version of the Common Core State Standards for English Language Arts and Mathematics at its General Business Meeting.

On June 7, 2010, the Board adopted the Common Core Standards for English Language Arts and Mathematics at its General Business Meeting.

c. Other policies affected

None. (Adoption of NGSS will not require any amendments to BOE Policy 102.3, Statewide Content and Performance Standards, approved on October 6, 2015.)

d. Arguments in support of the recommendation

The NGSS are:

- a set of performance expectations that integrate science and engineering core ideas, practices, and crosscutting concepts in a way that reflects the nature of science and engineering as practiced and experienced in the real world.
- internationally benchmarked and designed to prepare students for college, career, and citizenship.
- aligned to the Common Core State Standards in English Language Arts and Mathematics, which creates opportunities for integrated learning experiences and reinforcement of common practices across disciplines.

- an opportunity to proactively work collaboratively across states and to access resources designed using research-based best practices in science teaching and learning.
- supportive of teachers in Hawaii who are already engaged in, or interested in, rigorous and relevant science instruction, including place-based, phenomenon-based, problem-based, and/or integrated STEM (science, technology, engineering, mathematics) approaches.

e. Arguments against the recommendation

None.

f. Other agencies or departments of the State of Hawaii involved in the action

The Department's Office of Strategy, Innovation, and Performance will be involved in the development of NGSS-aligned state assessments and in determining implications of NGSS for accountability systems.

Additionally, discussions regarding NGSS have been held with members of the University of Hawaii System Office of STEM Education, the Office of the Vice President for Research and Innovation (STEM Pre-Academy), the Office of the State Director for Career and Technical Education, the Office of the Vice President for Community Colleges, the John A. Burns School of Medicine, the University of Hawaii at Manoa College of Engineering, the University of Hawaii at Manoa College of Education, Hawaii P–20, and the State Teacher Education Coordinating Committee. The response has been favorable from all parties.

g. Possible reaction of the public, professional organizations, unions, DOE staff and/or others to the recommendations

The NGSS have been shared through a variety of mechanisms with Department teachers and administrators. The general consensus is that the NGSS represent a step forward for science education, and its implementation will require professional development, time, resources, and communication.

Overall reaction to the NGSS is anticipated to be favorable.

h. Educational implications

The NGSS will strengthen students' foundations in scientific content, applications, and practices, thus better preparing Hawaii public school graduates for college, career, and citizenship.

Further, the NGSS will enable the Department to align professional development, curriculum, instruction and assessment to research-based best practices in science teaching and learning. It will support teachers in cultivating their ability to provide science learning opportunities for students that build coherently from kindergarten through twelfth grade and are aligned to Common Core State Standards in English Language Arts and Mathematics.

i. Personnel implications

None.

j. Facilities implications

Facilities needs to conduct a variety of scientific and engineering investigations will differ based on grade and content area.

k. Financial implications

The Department will rely on existing resources and personnel to support schools and teachers with the implementation of NGSS. Existing schools' science instructional materials may align with NGSS, thus reducing the need for schools to purchase new instructional materials. Further, the Department will actively seek grants to support professional development.

5. OTHER SUPPLEMENTARY RECOMMENDATIONS

None.

KSM:LK:itk

Attachment

c: Board of Education Members
Office of Curriculum, Instruction and Student Support

Student Achievement Committee

Committee Action on the Adoption of Next Generation Science Standards ("NGSS")

Hawaii State Board of Education
Student Achievement Committee
February 2, 2016

Why Science?

*…understanding science and the **extraordinary** insights it has produced can be **meaningful** and **relevant** on a personal level, opening new worlds to explore and offering **lifelong opportunities** for enriching people's lives.*

http://debtorby.typepad.com/connections/2007/03/leeward_hawaii.html

Framework for K–12 Science Education

What are the goals of science education?

https://commons.wikimedia.org/wiki/File:US_Navy_060207-N-3019M-004_Lt._Kyle_Lim,_industrial_hygiene_officer_assigned_to_Navy_Environmental_and_Preventative_Medicine_Unit_Six_(NEPMU-6),_prepares_to_test_a_water_sample_for_contaminants.jpg

1. Educating **all students** in science and engineering, and

2. Providing the **foundational knowledge** for those who will become the scientists, engineers, technologists, and technicians of the future.

Framework for K–12 Science Education

NGSS Background

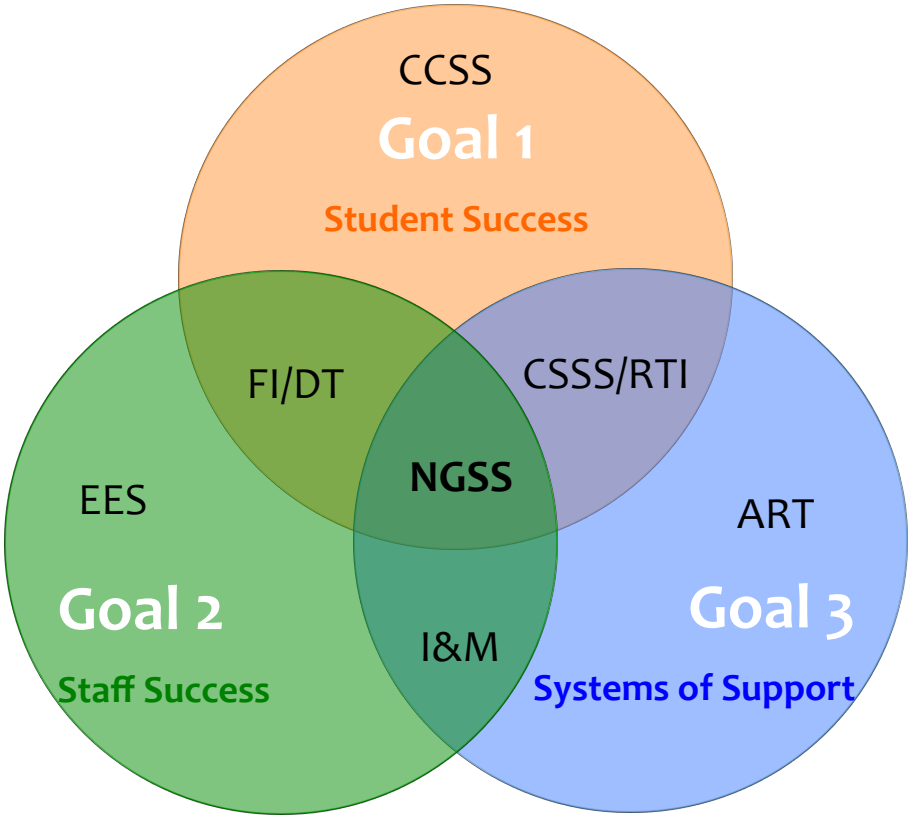
https://vimeo.com/64246763

NGSS For States, By States: Standards and Appendices can be downloaded from http://www.nap.edu/download.php?record_id=18290

NGSS Shifts

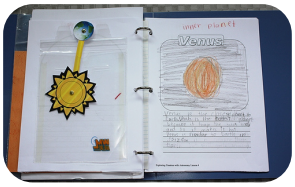
1. Integration of **scientific practices**, **crosscutting concepts,** and **core ideas** reflects the real-world nature of science.
2. Performance expectations are **learning goals** that span longer periods of instruction.
3. **Concepts build coherently** and all three dimensions build **in complexity** from K–12.
4. Application and deeper understanding of content are emphasized through **phenomenon- and problem-based learning**.
5. **Engineering is integrated** with science.
6. Designed **to prepare all students** for **college, career, and citizenship**.
7. Standards are **aligned to Common Core State Standards**.

NGSS Shifts
HI Student Perspective



NGSS Implementation

Recommendations from Hope Street Group Data Collection



hope street group
Hawaii Teacher Fellows Program

NGSS Implementation

Recommendations from Hope Street Group Data Collection

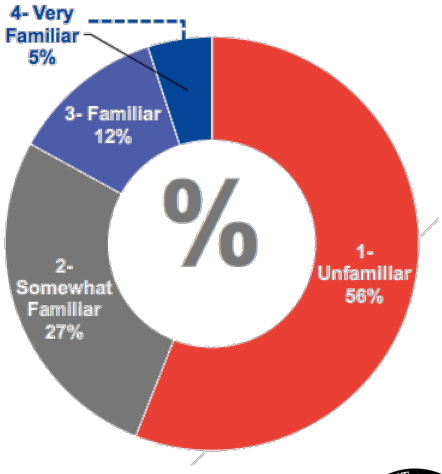
THE CENTER ON STANDARDS & ASSESSMENT IMPLEMENTATION
WestEd CRESST

hope street group
Hawaii Teacher Fellows Program

NGSS Implementation

Hope Street Group Data Collection

How familiar are you with the NGSS?



hope street group
Hawaii Teacher Fellows Program

NGSS Implementation

- Adoption
- Familiarity
- Integrating PSEs, CCCs, and Engineering
- Crosswalk and Transition
- Full implementation

NGSS Implementation

- Standards Alignment
- Curriculum and Instruction
- Assessment
- Professional Development
- Cross-Content Connections
- Communication

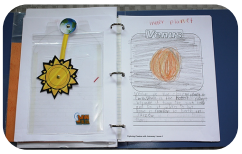
NGSS Implementation

Standards Alignment

School
- School transition plan
- Grade-level and cross-grade alignment

State
- Standards crosswalks
- ACCNs
- Standards bundles and curriculum maps

Complex Area
- Complex area priorities
- Vertical alignment, especially across transition years



NGSS Implementation

Curriculum and Instruction

School
- Needs assessment and materials purchase
- Implementation support

State
- Guidance for selecting curricular materials/ resources

Complex Area
- Curriculum needs assessment
- Science formative assessment support

NGSS Implementation

Assessment

School
- School-level assessments
- Preparation for statewide assessments

State
- Statewide summative assessment development

Complex Area
- Assessment development and preparation support

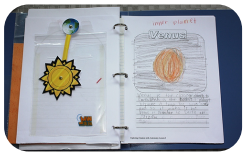
NGSS Implementation

Professional Development

School
- Professional Learning Communities
- Time for learning and implementation

State
- PD and PD support across all areas of implementation

Complex Area
- Complex area PD
- Support for schools



NGSS Implementation

Cross-content Connections

School
- Integrated planning, curriculum, and instruction

State
- Integration resources and examples for NGSS, CCSS, other content areas

Complex Area
- Academic language/ literacy and mathematical skill/practice needs assessment

NGSS Implementation

State

School

Communication
State, complex areas, schools, families, stakeholders

Complex Area

Teacher Thoughts
Science Content Panel

- *The interdisciplinary nature of science is truly embedded in the NGSS…**finally time for all of the other disciplines to come together**. Math is the language of science and science uses language to communicate and problem solve collaboratively.*

- *I like that it is **aligned with Common Core ELA and math.** Once teachers get used to the higher level thinking required by CC the transition to NGSS should be easier. Also the **argumentation skills they learn in ELA and math will help students as we ask them to draw conclusions using data.***

- *I think **NGSS will raise the bar for teachers and students to improve science teaching and learning in Hawaii.** I think the explicit **articulation of engineering within NGSS** is excellent…*

Science learning in school leads to citizens with the confidence, ability, and inclination to continue learning about issues, scientific and otherwise, that affect their lives and communities.

Framework for K–12 Science Education

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mahalo!