



# Next Generation Science Standards: Adoption Considerations

## July 11, 2013

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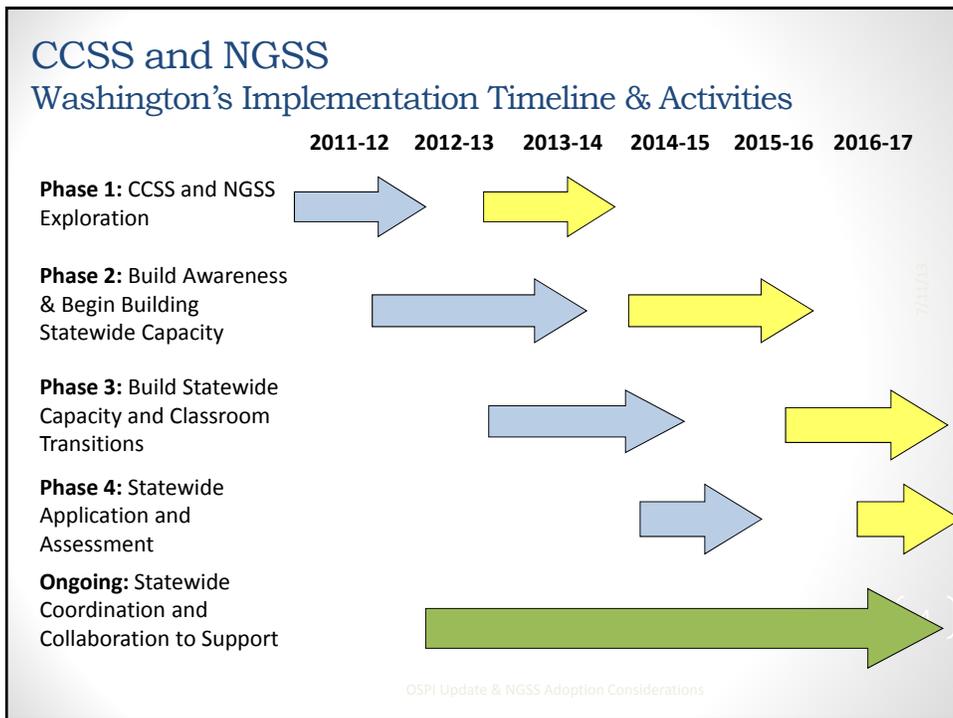
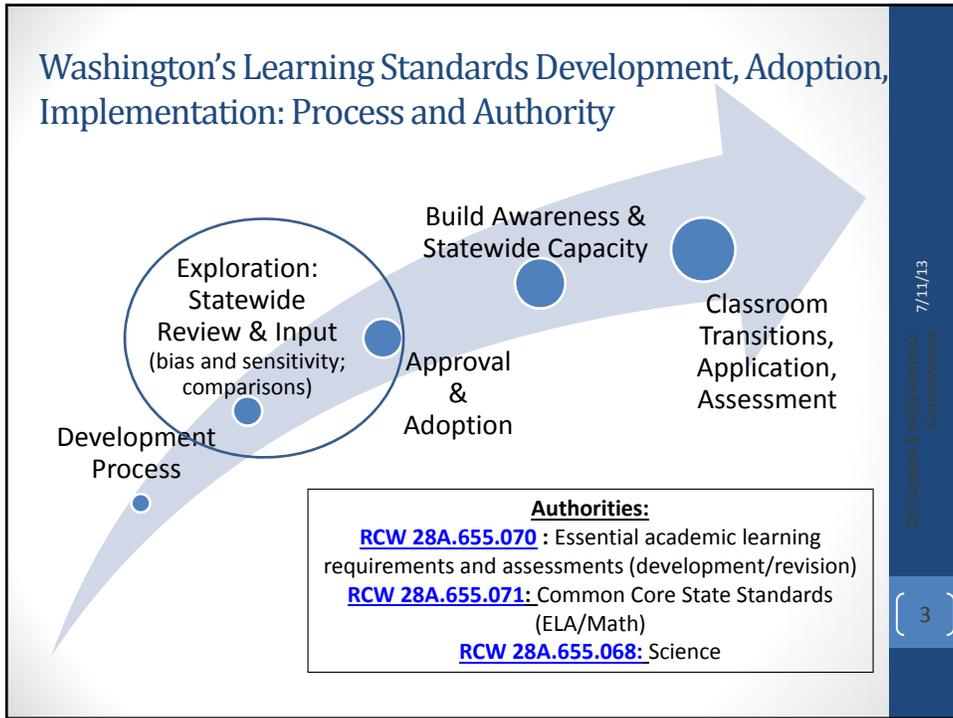
## Our Focus

Following up on topics generated in May SBE Meeting:

- NGSS review process and statewide support update
- Policy / Transition considerations
  - Connections with CCSS implementation
  - Graduation requirements
    - Assessments
    - High school courses
- Results of Washington NGSS Standards Comparison and Bias and Sensitivity Process

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## Ongoing: Statewide Coordination and Collaboration to Support Implementation

(Professional Learning Providers and Partners Across WA)



### Including:

- School Districts
- Higher Education
- Education and Educator Content Associations
- Business Partners

## Key Next Steps Once NGSS are Finalized

- Comparative Analysis (WA and NGSS) – **Completed** June 2013
- Bias and Sensitivity process – **Completed** June 2013
- Involve / Update key stakeholders – seek support and buy-in
  - Ed. Opportunity Gap Oversight and Accountability Commission
  - Legislative Committees
  - State Board of Education
  - State Curriculum Advisory and Review Committee
  - Education Associations
  - State Business and Industry / Private Partners
- Consider policy implications (HS assessments and course requirements)
- OSPI NGSS adoption: Superintendent Dorn – Anticipated late summer 2013



## Science Assessment Considerations: Federal Assessment Requirements

- No Child Left Behind (NCLB) requires that our state’s science standards must be assessed:
  - **Once in elementary school** (we give Measurements of Student Progress in 5<sup>th</sup> grade)
  - **Once in middle school** (we give MSP in 8<sup>th</sup> grade)
  - **Once in high school** (we give Biology End-of-Course exam)
- When we change our state standards in science we need to change assessments ([RCW 28A.655.070](#)).

## Science Assessment Considerations: State Assessment Requirements

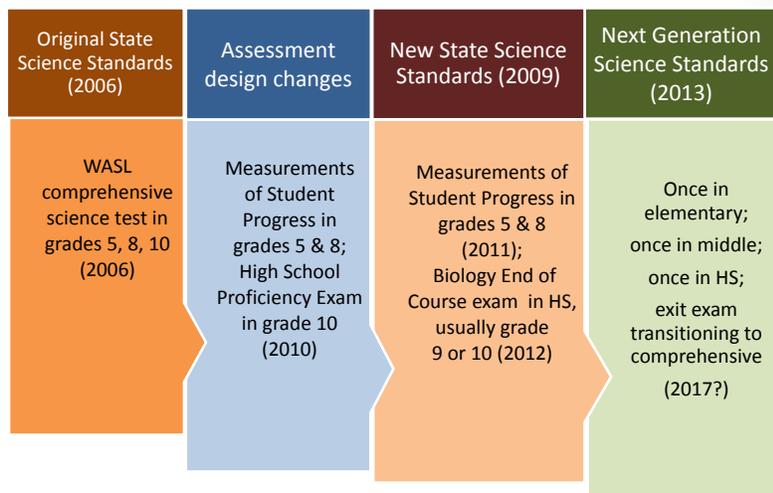
- Additionally, Washington has chosen to add an exit exam requirement for graduation:
  - Students in the Class of 2015 and beyond must pass the Biology EOC, or legislatively approved alternative
  - About half of the states do not have exit exams

### HOWEVER...

- [2013 Engrossed House Bill 1450, Section 4](#) provides direction for future science assessment requirements:

“The legislature intends **to transition from a biology end-of-course assessment to a more comprehensive science assessment** in a manner consistent with the way in which the state transitioned to an English language arts assessment and a comprehensive mathematics assessment. The legislature further intends that the **transition will include at least two years of using the student assessment results** from either the biology end-of-course assessment or the more comprehensive assessment **in order to provide students with reasonable opportunities to demonstrate high school competencies** while being mindful of the increasing rigor of the new assessment.”

## WA State Science Assessment Evolution



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## Assessment Transition for NGSS

- Washington joined a consortium (Smarter Balanced) to minimize the cost of transitioning to new assessments for Common Core:
  - Common Core subjects - only English Language Arts and Mathematics for grades 3-8 and 11, beginning in 2014-15.
  - Exit exams for graduation in ELA and Math articulated in [2013 ESB 1450](#)
- New high school content and assessments will have implications on high school course taking and on district capacity.
- For the NGSS, Washington would like to join a multi-state consortium to minimize the cost of transitioning to new assessments....



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## Overview of Key “Pre-Adoption” Activities Since May 2013



### Comparative Analysis and Bias and Sensitivity Processes

- Selected an external contractor to facilitate, coordinate, and report on both processes
- Selected two committees to complete the work
  - Committees consisted of over 40 WA educators, scientists and key statewide stakeholders
- OSPI role to orient to NGSS and to guide and inform committee work

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## Overview: Standards Comparison NGSS with WA 2009 Science Standards



### Focus of Analysis:

- Where overlaps and differences existed between the two standard sets;
- To identify new content or processes that existed; and
- To form the basis for developing a transition plan should the Superintendent adopt the NGSS.

### Methodology:

- Due to structural differences between the two sets of standards, it was not possible to do a direct quantitative alignment.
- Therefore, we elected to do a qualitative alignment.

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## NGSS and WA Standards Comparison



**Washington  
(2009)**





**NGSS  
(2013)**

**• Four Essential Academic Learning Requirements**

1. Systems
2. Inquiry
3. Application
4. Domains
  - Life Science
  - Physical Science
  - Earth and Space Science

**• Three Dimensions**

1. Science and Engineering Practices
2. Disciplinary Core Ideas (DCI)
  - Life Science
  - Physical Science
  - Earth and Space Science
  - Engineering and Technology (new)
3. Crosscutting Concepts

**• Explicit connections to:**

- Other science disciplines at this grade level
- Other DCIs for older and younger students
- Common Core State Standards in Mathematics and English Language Arts



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## NGSS Architecture



<b>Performance Expectations</b>		
<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Cross-Cutting Concepts</b>
<p><b>Connections to</b></p> <ul style="list-style-type: none"> <li>• Other science disciplines at this grade level</li> <li>• Other DCIs for older and younger students</li> <li>• Common Core State Standards in Mathematics and English Language Arts</li> </ul>		

In a sense, the NGSS integrates the Washington EALRs by combining the content, the habits of mind and the practice of science.

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## Standards Comparison Tools



Kindergarten NGSS and WA State EALRs 1-3 Comparison									
NGSS Performance Expectation	EALR 1 Systems	EALR 2 Inquiry							EALR 3 Application of Science
		NGSS Science and Engineering Practices							
NGSS Cross-Cutting Concepts	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	Nature of Science
K-PS2-1									
K-PS2-2	(*)			(*)	(*)				(*)
K-PS3-1				(*)					(*)
K-PS3-2									
K-LS1-1	X				X		X		X
K-ESS2-1					X				
K-ESS2-2	X		X				X		X
K-ESS2-3	X	X	X				X	X	X
K-ESS3-3	X						X	X	X
K-2-ETS1-1	X	X						X	X
K-2-ETS1-2	X		X						X
K-2-ETS1-3					X				X

Grade 1				
NGSS Standard	Title	Comparison to EALR 4	Agree	Disagree
1-PS4	Waves and their Application in Technology for information transfer	New	<input type="radio"/>	<input type="radio"/>
1-LS1	From Molecules to Organisms: Structures and Processes	Subsumes parts of WA K-1 LSI (Plant and Animal Parts)	<input type="radio"/>	<input type="radio"/>
1-LS3	Heredity: Inheritance and Variation of Traits	Mostly new; Subsumes parts of WA K-1 LSI (Classifying Plants and Animals)	<input checked="" type="radio"/>	<input type="radio"/>
1-ESS1	Earth's Place in the Universe	Subsumes WA K-1 ESI Earth in Space (Observing the Sun and the Moon)	<input type="radio"/>	<input type="radio"/>

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## Findings



- The vast majority of Washington science standards are fundamentally incorporated into the NGSS.
- There is some movement of disciplinary core ideas between grades at the elementary level, but this realignment goes hand in hand with the goal of not getting ahead of the CCSS-M and CCSS-ELA standards.
- In particular, the Systems, Inquiry and Application standards from Washington's current standards are well-covered in the NGSS.
- Modest differences exist between the Disciplinary Core Ideas in the NGSS and the Domain standards in Washington's EALR 4.
  - Most of the difference involves re-sequencing and an emphasis on current scientific applications, but there is also a fundamental shift to a deeper focus on fewer topics, much like the CCSS.

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## Sample Transition Plan: Grade 1



Grade 1	
Year 0	Awareness Work; study K-12 Framework Science and Engineering Practices; Introduce Cross Cutting Concepts
Year 1	Phase in 1-ESS1 Earth's Place in the Universe See kindergarten. ✓
Year 2	Phase in 1-LS1 From Molecules to Organisms: Structures and Processes and 1-LS3 Heredity: Inheritance and Variation of Traits ✓
Year 3	Phase in 1-PS4 Waves and their Application in Technology for information transfer ✓
Comments: See kindergarten.	

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## General Transition Advice



Participants provided transition planning input focused on a series of guiding questions focused both on high-level and detailed policy and detailed implementation issues.

### Statewide Approach/Support

- HS Courses Pathways: Develop explicit supports that make connections with NGSS and STEM courses and CTE pathways. (NGSS, [Appendix K](#))
- Develop a communications plan with regard to the adoption of and transition to the NGSS in conjunction with CCSS.
- Work with other states on a model process for vetting instructional materials, with a focus on pedagogical issues.

### Implementation Considerations

- Develop short (2-3 minute) video vignettes on practices to create professional development modules.
- Support transition from WA's Application EALR to NGSS Engineering Performance Expectations.
- Intentionally connect STEM and CCSS practices to the NGSS.
- Place initial emphasis on pedagogical practices (shifts) not immediately on instructional materials, kits, labs, etc.

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## Overview: Bias and Sensitivity Process



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### The Committee:

40 workgroup committee members included science educators, administrators, librarians, special education experts, representatives from diverse communities and higher education faculty

### The Focus and Methodology:

- To provide specific strategies for engaging all students in learning science with particular emphasis on strategies for classroom, home and community connections, and school resources for science instruction.
- Develop recommendations for ways to engage students with one or more diversity characteristics who have historically been underserved in science education, with the expectation that engagement is the first and most important step to reduce the achievement gap and open new college and career opportunities for all students.
- Listen to and interact with experts presenting their ideas about teaching diverse learners, and collaborate in small groups to identify strategies and develop recommendations.
- Review current research on science education based on No Child Left Behind Act of 2001 reporting groups and extended recommendations to include groups within [NGSS Appendix D](#).

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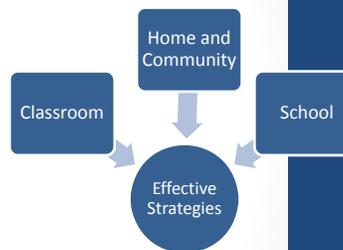
## Bias and Sensitivity Workgroup Tasks



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1. Orient to foundational NGSS and Bias and Sensitivity research and topics
  - Learn from and engage with four educators with expertise in reaching diverse student populations.
2. Identify and vet effective strategies to engage diverse learners in three domains, classroom, home and community, and school.
  - Teams selected a grade, NGSS Disciplinary Core Idea and topic to ground their work. A question was posed to each team:
 

*How could the standards be taught in a way that addresses the needs of students from diverse backgrounds?*



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## Expert perspectives and recommendations representing students' voices...



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**Jose Rios**, UW, Pre-service Elementary focus:

- Quality instructional unit design recommendations

*"Often we present material as written, showing fidelity to the curriculum instead of the student, which can result in the failure to add context. Do the pre-work to anticipate this."*



**Phyllis Harvey-Buschel**, UW MESA Curriculum Director:

- Student engagement and instructional strategy recommendations

*"To me, an immigrant metaphor has always seemed to provide just the right terms to describe both the challenges and opportunities offered to MESA students with the NGSS. Whether it is 'charting a new course in a new school or at work' an immigrant needs to have the patience required to navigate different cultures and behaviors."*



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## Expert perspectives and recommendations representing students' voices...



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**Ann Renker**, Neah Bay School District, Makah Nation, High School Principal:

- College readiness and student engagement strategies

*"Right now tribes are importing this talent in science, math and technology."*



**Thomas Romero**, ESD 105 Migrant Education Director:

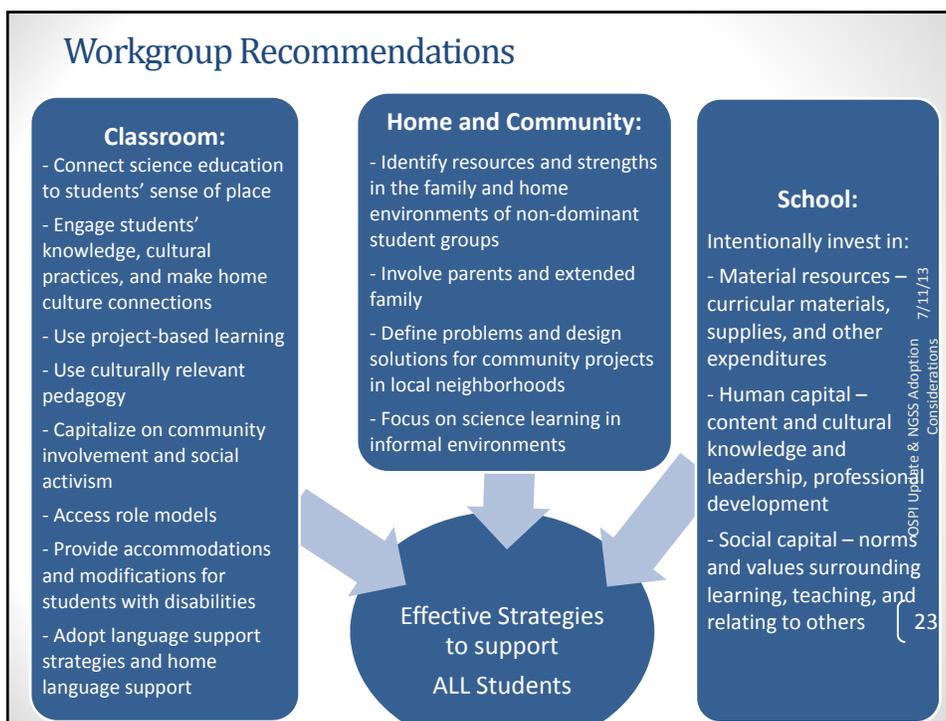
- English Language Learner instructional engagement recommendations

*"Connecting the head, hand and heart is crucial in successfully supporting our teachers and students in the articulation of the standards: CCSS, ELD\*, and NGSS. We need to make these connections intentionally and explicitly."*



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## Applying the Bias and Sensitivity Recommendations


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- OSPI encourages districts to engage in conversations around a bias-free and culturally sensitive implementation of the NGSS.
  - Districts can use this report and the assessment tool as a roadmap to have important conversations about how to implement the NGSS with their particular student populations.
- Local experts, educators, and community members can participate in dialog about the most effective strategies to engage local students in learning science. The real value is in the process of coming together, discussing ideas for implementing the strategies, and learning from each other.

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## Key Next Steps *Leading to and Following* Adoption



- **Transition Planning**
  - Guided by results of Comparative Analysis and Bias and Sensitivity Recommendations
    - In light of NGSS shifts
  - In context and in conjunction with CCSS 3-year transition plans and partnerships
  - In light of the foundations we have to build on
    - Regional science and STEM activities and supports
    - Math Science Partnerships and other professional development resources
      - Seattle/Renton MSP focuses on NGSS
- **State assessment system adjustments**
- **Collaboration / coordination across states adopting NGSS**



## Thank you for your time today



Neah Bay HS Students Reviewing NGSS

### For more information, please contact:

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