California’s Next Generation Science Standards (CA NGSS) Assessment Plan

State Board of Education
March 2016

Michelle Center, Director
Assessment Development and Administration
March SBE Meeting

• The SBE action today:
  – Approve grades for administration consistent with the assessment design plan

• Approval will allow us to prepare for the pilot testing in 2016-17.

• The assessment itself will change/improve over time.
CA NGSS assessments are part of the CAASPP System.

The timeline for development of the new CA NGSS assessment is as follows:

- Spring 2017: Pilot item/item tryout
- Spring 2018: Field Test (census)
- Spring 2019: Operational Administration

Educational Testing Service (ETS) is the contractor charged with the design and development of the new CA NGSS-aligned assessment.
Role of Educators and Other Stakeholders in CA NGSS Design Process

CA NGSS design was informed by feedback provided by:

| Hundreds of CA science teachers, including representatives of the California Science Teachers Association | Higher education officials, including representatives of Stanford University’s NGSS Assessment Program (SNAP) | STEM reform experts, including representatives from NRC’s Framework for K-12 Science Education | Representatives from various other advocacy groups |
Stakeholder Priorities for NGSS Assessments

- Focus on providing information to support the *improvement of teaching and learning*.
- Promote the dramatic shift in science instruction across all grades.
- Reflect fidelity to the NGSS.
Design Team Members

- David Baum, Systems Analyst & Interoperability Specialist, ETS
- Dr. Katherine Castellano, Psychometrician, ETS
- Peter Chan, General Manager, Application Development, ETS
- Dr. Tim Davey, Psychometrician, ETS
- Dr. Janet Koster von Groos, Assessment Specialist, Physics, ETS
- Dr. Cara Laitusis, Director, Validity Research, ETS
- Cassandra Malcom, NGSS Program Manager, ETS
- Dr. James Pellegrino, Professor and Co-Director of the Learning Sciences Institute, University of Illinois, Chicago
- Dr. Kathleen Scalise, National Assessment of Educational Progress (NAEP) Science Director, ETS; Professor, University of Oregon
- Kit Viator, Executive Director, K−12 Assessment, ETS
CA NGSS Assessment Design Goals

Goals for the design are to:

• Emphasize importance of group-level results to promote improvements to teaching and learning.
• Provide models of high quality, CA NGSS-aligned assessment items.
• Create incentives for schools to provide science instruction in every grade, not just in tested grades.
• Measure the range and depth of NGSS performance expectations by leveraging the state’s distinctly large student population.
• Minimize testing time and costs.
CA NGSS Design Features

• Assessment design measures the range and depth of CA NGSS performance expectations (PEs) over a three year cycle.

• Assessment items, generated by evidence-centered design based task models, each integrate a minimum of two NGSS dimensions:
  – Disciplinary core ideas (DCIs)
  – Science and engineering practices (SEPs)
  – Crosscutting concepts (CCCs)

• Design makes use of a diverse range of item types.
• Both independent items as well as item sets are used.
CA NGSS Design Features (continued)

• This is a two-stage adaptive assessment.
• Uses partial matrix sampling of content
  – Group level feedback while ensuring individual student performance is measured fairly and comparably
• Administered at grades five, eight and grade ten, eleven, or twelve.
• The assessment is designed to be administered in two hours or less.
The design requires that all students in the tested grades (5, 8, and 10, 11 or 12) participate in *three segments* of the test:

- **Segment A** is a two-stage adaptive segment
  - Machine-scorable short answer and selected response items that cover a very *broad* range of the CA NGSS PEs
  - Contributes to student and group scores
Transition from Segment A to Segment B

− Performance in **Segment A** guides selection of DCIs presented in **Segment B**.

− The assignment of the item content (DCIs) in **Segment B** will be random unless DCI performance in **Segment A** is particularly weak.
Summative Segment B

- **Segment B** includes item sets which require students to solve a series of complex problems set in *discipline-specific* contexts which deeply measure a student’s command of selected CA NGSS PEs.
  - Contributes to student and group scores.
Summative Segment C

• **Segment C** includes a range of items that, collectively, broadly and deeply measure the CA NGSS PEs associated with the tested grade-span.
  – *All* CA NGSS PEs (minus those identified as not suitable for summative assessments) will be *collectively* assessed at the group-level.
    • Encourages the teaching of science at all grade levels
    • Contributes to group-level scores.
## Design Summary

<table>
<thead>
<tr>
<th>Segment A</th>
<th>Segment B</th>
<th>Segment C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reporting Level</strong></td>
<td>Contributes to <em>Student</em> and <em>Group</em> Score</td>
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<tr>
<td><strong>Scope and Depth of Measurement</strong></td>
<td>Wide breadth—measures a broad sample of CA NGSS PEs</td>
<td>Deep measurement of targeted sample of 1-2 item sets (multiple CA NGSS SEPs and CCCs per item set, and one or more DCIs per item set as specified by task models)</td>
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<tr>
<td><strong>Type of Items</strong></td>
<td>Selected-response, machine-scorable items. Items primarily independent but some organized in sets.</td>
<td>Item sets which require students to solve a series of complex problems set in discipline-specific contexts.</td>
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<tr>
<td><strong>CA NGSS PEs measured by grade/grade span</strong></td>
<td>Gr. 5: Grade 5-specific PEs Gr. 8: Grade-span PEs Gr. 10/11/12: Grade-span PEs</td>
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