2011 – 2012

SCIENCE ASSESSMENT

OF THE

2009 SCIENCE CONTENT STANDARDS

OREGON DEPARTMENT OF EDUCATION
OFFICE OF ASSESSMENT AND INFORMATION SERVICES

Updated March 1, 2011

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Office of Assessment & Information Services
Oregon Department of Education

255 Capitol Street NE
Salem, OR 97310
(503) 947-5600

Susan Castillo
State Superintendent of Public Instruction

Doug Kosty
Assistant Superintendent

Tony Alpert
Director, Assessment and Evaluation

Steve Slater
Manager, Scoring, Psychometrics and Validity

Kathleen Vanderwall
Manager, Test Design and Administration

Holly Carter
Assessment Operations and Policy Analyst

Ken Hermens
Language Arts Assessment Specialist

Leslie Phillips
Science and Social Sciences Assessment Specialist

James Leigh
Mathematics Assessment Specialist

Dianna Carrizales-Engelmann
Director, Monitoring, Systems, and Outcomes

Bradley J. Lenhardt
Monitoring and Assessment Specialist

Sheila Somerville
Electronic Publishing Specialist

Kathy Busby
Project Manager

Assessment of the 2009 Science Core and Content Standards

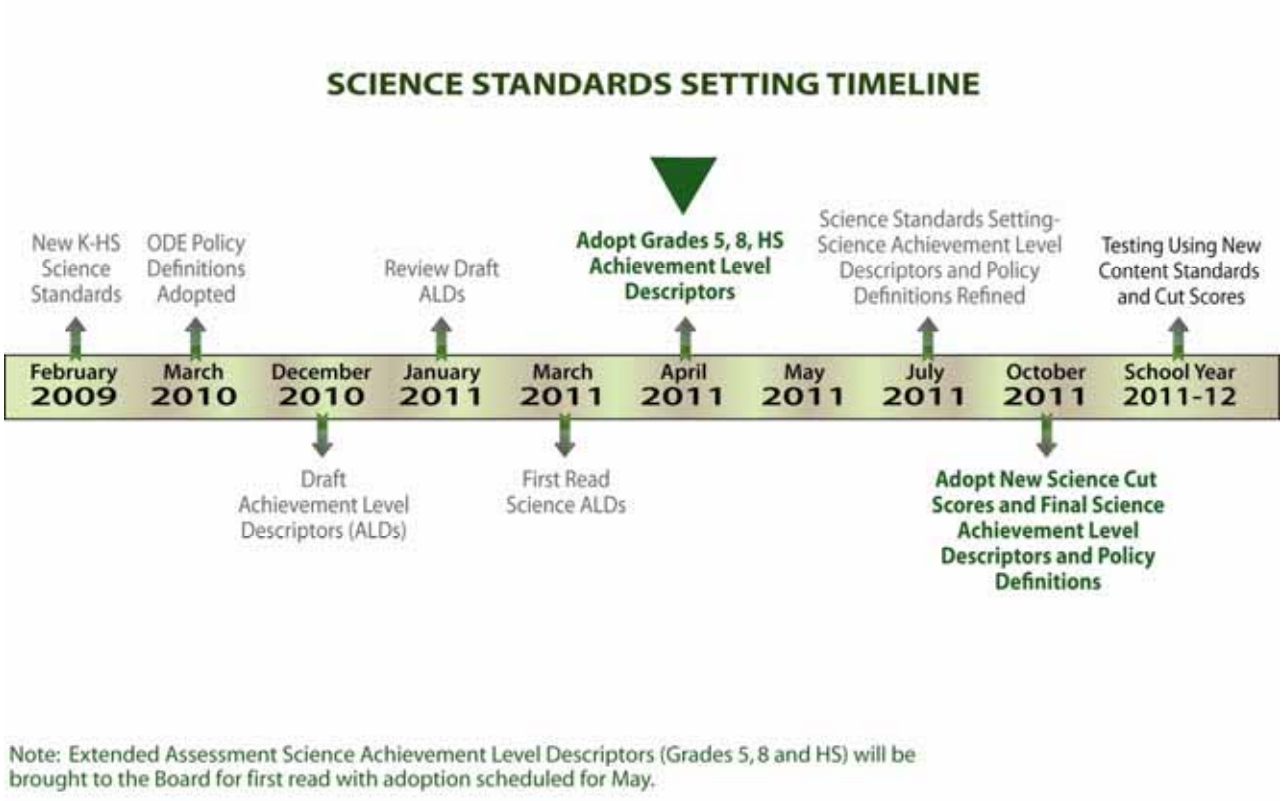
History and Development

The Oregon review of the current science standards began in August 2007 with a two-day work session for the Science Content and Assessment panel facilitated by national and international science education experts. The panel reviewed world class standards, effective learning progression models and studied the latest science education standards research. The science panel continued to research, conducted gap analysis of the current standards and designed a model for statewide consideration. The first draft of the 2009 core and content standards was distributed to organizations, groups and individuals in December 2008 for statewide review. The final revised Science Core and Content Standards and supporting materials were submitted and approved by the Oregon State Board of Education in February 2009.

After adoption, the Oregon Department of Education's Office of Assessment and Information Services began a study of the current test questions and assessment tools. An alignment study was completed by an independent contractor, WestEd, www.WestEd.org. Findings were received September 2009, and, based on initial review, the following conclusions were reached:

- A majority (98-99%) of ODE's current test items align to the 2009 core or content standards.
- 86% of those test items align to both the 2001 and 2009 standards at the same benchmark level.

To meet the full breadth of content and appropriate cognitive demand as outlined in the 2009 content standards, item development and field testing were conducted between spring 2009 and the present. The following timeline outlines subsequent steps, including achievement standard verification, to be completed by fall 2011.



Note: Extended Assessment Science Achievement Level Descriptors (Grades 5, 8 and HS) will be brought to the Board for first read with adoption scheduled for May.

Phase-in of the Assessment

2009-2010	Students were assessed on the 2001 standards with Field Test Items reflecting learning targets that align to both the 2001 and 2009 standards. *Districts update the basis for science curriculum to the new 2009 standards. Teachers base classroom instruction on 2001 Benchmark Standards and prepare for transition to instruction based upon the new 2009 science standards.*
2010-2011	Students were assessed on 2001 standards with Field Test Items reflecting learning targets that align to the new 2009 Standards. *Teachers base classroom instruction on the new 2009 grade level core and content standards.*
July 2011	Achievement Standard Verification (Cut Scores Established) 2009 Achievement Level Descriptors reviewed and finalized.
2011-2012	Students are assessed on the 2009 Content Standards using calibrated items that align to the 2009 Content Standards. *Teachers base classroom instruction on the 2009 Core and Content Standards.*

Reporting

The adopted 2009 Science Core and Content Standards define the scientific content knowledge and process skills that all students are expected to learn during science instruction in K-8 and high school http://www.ode.state.or.us/teachlearn/subjects/science/curriculum/2009_adopted_k-h_science_standards_updated(11.13).pdf. These standards will be assessed through OAKS Online beginning in 2011-12.

The 2009 science content standards are organized under four Core Standards. The Core Standard statements describe the unifying concepts and processes in science. Core Standards One, **Structure and Function**, and Two**, Interaction and Change**, describe the big ideas in the three science disciplines or subjects of **Physical, Life, and Earth and Space**. Core Standards Three, **Scientific Inquiry**, and Four, **Engineering Design**, describe the science process skills and understandings that characterize the nature and practice of science and engineering.

The Oregon statewide science assessment delivered through OAKS Online measures what students know and can do during testing at grades 5, 8 and high school. Testing at grade 5 assesses grade 3-5 content standards; grade 8 assesses grade 6-8 content standards; and the high school content standards are assessed at grade 11.

Student information from 2011-12 OAKS Online Science will be reported through six Score Reporting Categories (SRC) including the four Science Core Standards and three Science subjects as sub categories. Scientific Inquiry (SRC 3) and Engineering Design (SRC 4) scores will be combined and reported together as SRC 8 (Science Processes).

- **Structure and Function (SRC 1):** Understand living and non-living things have characteristics, form and function, and are composed of components that function together to form systems.
- **Interaction and Change (SRC 2):** Understand components in a system can interact in dynamic ways, within or without that system, and may result in change.
- **Physical Science (SRC 5):** Understand structures and properties of matter, forms of energy, and changes that occur in the physical world.
- **Life Science (SRC 6):** Understand structures, functions, and interactions of living organisms and the environment.
- **Earth and Space Science (SRC 7):** Understand physical properties of the Earth and how those properties change. Understand Earth's relationship to other objects in the Universe.
- **Scientific Inquiry and Engineering Design (SRC 8):** Understand science process concepts and skills that characterize the nature and practice of science. Scientific Inquiry (SRC 3) is a systematic process that includes proposing testable hypotheses, collecting, analyzing, and interpreting data to produce evidence-based explanations and new explorations. Engineering Design (SRC 4) is a process of formulating problem statements, identifying criteria and constraints, testing solutions, and incorporating modifications based on test data and communicating the recommendations.

This table diagrams the science unifying concepts and processes to be reported in 2011-12.

<table>
<tr><td colspan="2" rowspan="3">Score Reporting Categories</td><td colspan="4">Unifying Concepts and Processes</td></tr>
<tr><td colspan="2">Big Ideas</td><td colspan="2">Science Processes</td></tr>
<tr><td>*Structure and Function (SRC 1)</td><td>*Interaction and Change (SRC 2)</td><td>**Scientific Inquiry (SRC 3)</td><td>**Engineering Design (SRC 4)</td></tr>
<tr><td rowspan="4">Science Disciplines or Subjects</td><td>*Physical Science (SRC 5)</td><td>Structure and Function in Physical Science</td><td>Interaction and Change in Physical Science</td><td colspan="2" rowspan="3">**Scientific Inquiry and Engineering Design (SRC 8)</td></tr>
<tr><td>*Life Science (SRC 6)</td><td>Structure and Function in Life Science</td><td>Interaction and Change in Life Science</td></tr>
<tr><td>*Earth and Space Science (SRC 7)</td><td>Structure and Function in Earth and Space Science</td><td>Interaction and Change in Earth and Space Science</td></tr>
</table>

*Test items aligned to SRC 1 and SRC 2 will also be reported to a subject SRC of Physical Science, Life Science, or Earth and Space Science. But, each test item in SRC 1 or SRC 2 will only be counted **once** toward a student's summary science score.

In 2011-12, test items aligned to SRC 3 and SRC 4 will be reported only **once as SRC 8. As future funding allows, item development will continue so that Scientific Inquiry (SRC 3) and Engineering Design (SRC 4) can be independently reported.

This table day shows the same reporting scheme including the SRC descriptions.

<table>
<tr><td colspan="2" rowspan="3">Score Reporting Categories</td><td colspan="3">Unifying Concepts and Processes</td></tr>
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<tr><td>*Structure and Function (SRC 1)
Understand living and non-living things have characteristics, form and function, and are composed of components that function together to form systems.</td><td>*Interaction and Change (SRC 2)
Understand components in a system can interact in dynamic ways, within or without that system, and may result in change.</td><td>**Scientific Inquiry (SRC 3)
Understand scientific investigation of the natural world is a systematic process that includes proposing a testable hypothesis, collecting, analyzing, and interpreting data to produce evidence-based explanations and new explorations.</td><td>**Engineering Design (SRC 4)
Understand engineering design is a process of formulating problem statements, identifying criteria and constraints, testing solutions, and incorporating modifications based on test data and communicating the recommendations.</td></tr>
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Understand science process concepts and skills that characterize the nature and practice of science. Scientific Inquiry (SRC 3) is a systematic process that includes proposing testable hypotheses, collecting, analyzing, and interpreting data to produce evidence-based explanations and new explorations. Engineering Design (SRC 4) is a process of formulating problem statements, identifying criteria and constraints, testing solutions, and incorporating modifications based on test data and communicating the recommendations.</td></tr>
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Understand structures, functions, and interactions of living organisms and the environment.</td><td>Structure and Function in Life Science</td><td>Interaction and Change in Life Science</td></tr>
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Understand physical properties of the Earth and how those properties change. Understand Earth's relationship to other objects in the Universe.</td><td>Structure and Function in Earth and Space Science</td><td>Interaction and Change in Earth and Space Science</td></tr>
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The following are links to important science assessment documents. New and updated science standards documents will be added throughout 2011-12.

Science Test Specifications and Blueprint
http://www.ode.state.or.us/search/page/?id=496

Science Sample Tests
http://www.ode.state.or.us/search/page/?id=444

Local Performance Assessment Phase-In for the new Scientific Inquiry and Engineering Design Scoring Guides

School Years:	2009-2010	2010-2011	2011-2012 and beyond
Official Scoring Guide for Student Work Samples	2002 Scientific Inquiry Scoring Guide	2002 Scientific Inquiry Scoring Guide/	2009 Scientific Inquiry Scoring Guide and Engineering Design Scoring Guides
Development and Update to the Scoring Guides	Drafts of the 2009 scoring guides for Scientific Inquiry and Engineering Design (posted and distributed May- December)	2009 Scientific Inquiry Scoring Guide and Engineering Design Scoring Guide available for study and scoring.	2009 scoring guide anchor paper pool development

The following are links to Scientific Inquiry and Engineering Design scoring guide documents and teacher resources. New and updated anchor papers and work sample tasks will be added throughout 2011-12.

Scientific Inquiry and Engineering Design Scoring Guides
http://www.ode.state.or.us/search/page/?id=1414

Scientific Inquiry and Engineering Teacher Resources
http://www.ode.state.or.us/search/page/?id=1414