Alignment of Oregon Science Standards

Crosswalk of 2009 Oregon Science Standards to
2014 Oregon Science Standards (Next Generation Science Standards)

OREGON DEPARTMENT OF EDUCATION

Alignment of Oregon Science Standards

2014 Science Standards (Next Generation Science Standards) and 2009 Science Standards

Introduction

These pages show how the content, practices, and cross-cutting concepts (CCC) associated with the new Oregon Science Standards (NGSS) adopted in March 2014 align to the Oregon Science Standards adopted in February 2009. It is important to remember that the new Oregon Science Standards (NGSS) will be phased in so that districts can implement changes in local curriculum, provide appropriate professional development for teachers and administrators, and provide students with opportunities to learn the content, practices, and cross-cutting concepts prior to assessment. Oregon students will continue to be assessed on the Oregon 2009 Science Content Standards via OAKS Science until a new science assessment that aligns with the newly adopted standards is developed and becomes operational in 2018-2019.

Purpose

The purpose of this document is to provide educators with a view of the alignment between the 2009 content standards currently required as part of each Oregon district's curriculum and instruction in the subject area of science, and those contained in the new 2014 Oregon Science Standards (NGSS). An examination of the content of these pages is meant to provide at least some clarification on the following issues:

- What content, practices, and cross-cutting concepts are new and have not previously been a part of Oregon's 2009 Science Standards?
- What content, practices, and cross-cutting concepts will now need to be part of the curriculum at an earlier (or later) grade level than where they are currently taught and assessed?
- In what instances are similar skills being addressed, but with a somewhat different emphasis or with different expectations regarding the degree of sophistication?

Organization of the Alignment Tables

The rows in the table show whether there is a corresponding 2009 Oregon science standard(s) for each of the new 2014 Oregon science standards (NGSS) performance expectation (PE) in the areas of content, practices, and cross-cutting concepts (CCC). Codes designate the degree of alignment: S = Strong; P = Partial; D = Different Grade; N = New (not in any 2009 ORSS). The 2009 Oregon Science Standards that are not aligned to any new 2014 Oregon Science Standard (NGSS) are included at the end of the document. The bulleted statements at the beginning of the document provide summary information about the differences between the two sets of standards.

Alignment of Oregon's 2014 Science Standards (NGSS) with 2009 Oregon Science Standards (2009 ORSS)

Degree of Alignment Codes: **S** = Strong; **P** = Partial; **D** = Different Grade; **N** = New (not in any 2009 ORSS)
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Grade: 6

- There is general alignment in the NGSS practices and the 2009 ORSS. The NGSS add evidence-based argumentation, developing and using models, and mathematical and computational thinking which align with the CCSS.
- Teaching and learning shifts from content-based to practice-based instruction that integrates core content.
- The NGSS PEs identify limitations and boundaries. It is essential to read the NGSS foundation boxes.
- Some 2009 ORSS high school standards have moved to the middle school level increasing the level of rigor at both levels.

NGSS PE	2009 ORSS	NGSS Content	NGSS Practice	NGSS CCC	Notes on Alignment
MS-PS3 Energy					
MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	6.1P.2 8.2P.2 6-8.4D.2	P D/P	 S	P S	CCC is energy and matter. 2009 ORSS does not specifically mention thermal energy.
MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	6.1P.1 6.1P.2 8.1P.1 8.1P.3 8.2P.2 6-8.3S.1	P P D/P D/P D/S	 S	P N N S N	CCC is scale, proportion, and quantity; and energy and matter.
MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	6.1P.2 8.2P.2 7.2P.1 H.2P.3	P D/S D/P D/P	N N N N	S S S S	CCC is energy and matter The practice is new, but the content is covered in the 2009 ORSS.
MS-LS1 From Molecules to Organisms: Structures and Processes					
MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	6.1L.1 6-8.3S.1 6-8.3S.2	P	 S P	N	CCC is compare/contrast in 2009 ORSS. Assumes evidence-based explanation. CCC is scale, proportion, and quantity.
MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	6.1L.1 6.2L.1 7.2L.1	P P D/P	N	P	Combination of three 2009 ORSS is strongly aligned. Modeling component of this NGSS is new CCC is structure and function.
MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	6.2L.1 6-8.3S.2	S	 P	N	2009 ORSS implies the concept of systems. Evidence not used for argumentation in 2009 ORSS. CCC is systems and system models.

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NGSS PE	2009 ORSS	NGSS Content	NGSS Practice	NGSS CCC	Notes on Alignment
MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	6.2L.2 7.1L.1 7.1L.2 8.2L.1 6-8.3S.2	P D/P D/P D/P	 P/N	P/N	Behavior not strongly emphasized in 2009 ORSS. Argumentation is new; evidence should come from a variety of sources, not just a controlled investigation. CCC cause and effect is implied in 2009 ORSS.
MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	6.2L.2 7.1L.2 7.2L.2 6-8.3S.2	P/N D/P D/P	 P	N	Very weak alignment; focus is on growth of organisms and the factors that affect it. CCC cause and effect is implied in 2009 ORSS.
MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	6.1L.1 6.2L.1 6-8.3S.1 6-8.3S.2	P/N P/N	 P/N P/N	N	New content, new CCC, and new practice. CCC is cause and effect.
MS-LS3 Heredity: Inheritance and Variation of Traits					
MS-LS3-2. Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	7.1L.1 7.1L.2	P P	N	N	Shift from compare and contrast to model. Developing and using models is not language contained in 2009 ORSS and is new in NGSS. CCC is cause and effect.
MS-ESS2 Earth's Systems					
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	6.2E.1 H.1E.2	S D/P	N	N	Developing and using models is not language contained in 2009 ORSS and is new in NGSS.
MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	8.2E.3 6.2E.1 6-8.3S.1 H.1E.2	D/S P D/P	 P 	N	Collecting and providing evidence does not necessarily come from a designed and conducted investigation. The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE.
MS-ESS2-6. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	8.2E.3 8.1P.3 H.1E.2	D/S D/P D/P	N	N	Loose connection to motion and spacing of particles. Developing and using models is not language contained in 2009 ORSS and is new in NGSS.

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NGSS PE	2009 ORSS	NGSS Content	NGSS Practice	NGSS CCC	Notes on Alignment
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	7.2E.1-3 6-8.3S.1 6-8.4D.2 H.2E.4	D/S D/S	 P P	N	The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE.
MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	7.2E.2 7.2E.3 6-8.3S.1	D/S D/S	 P	N	The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE.
MS-ETS1 Engineering Design					
MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	6.4D.1 7.4D.1 8.4D.1 8.4D.3		S D/S D/S D/S	N N N	2009 ORSS is contained within NGSS, but NGSS PE takes it further. 2009 ORSS does not specifically address environmental impacts (but adding 8.4D.3 to 8.4D.1 is a strong match).
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	6.4D.2 7.4D.2 8.4D.2		P D/P D/P		Evaluation implies the collection and use of evidence, which makes a stronger alignment. Oregon scoring guide for ED includes evaluating competing solutions.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	6.4D.2 7.4D.2 8.4D.2		N D/P D/P		NGSS PE includes optimization.
MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	8.4D.2		N		
2009 ORSS not aligned to any NGSS:					
6.1E.1 Layers of Earth are implied but not an explicit PE in NGSS.					
6.3S.3 focus is on characteristics of controlled experiments and how theories change over time that are not addressed explicitly in NGSS.					