Alignment of Oregon Science Standards

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

OREGON DEPARTMENT OF EDUCATION

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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)

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Grade: 7

- 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-PS1 Matter and its Interactions					
MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.	8.1P.1 7.1P.1	D/S P	D/P P	N N	CCC is scale, proportion, and quantity. 2009 ORSS focuses on describing a model. The NGSS focuses on creating a model.
MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	8.2P.1 8.1P.1 6.1P.1 8.3S.2	D/P D/P P	N N P D/S	D/P D/P N D/P	CCC is patterns. The 2009 ORSS combined are strongly aligned.
MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	7.1P.1 7.2E.1 7.4D.3 8.4D.3	P S	P S S D/S	P N P N	CCC is structure and function. The concept of synthetic materials coming from natural resources is new.
MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	6.1P.2 8.1P.1 8.1P.3 8.2P.2	P D/P D/S D/P	N D/P D/P D/P	N N D/S D/S	CCC is cause and effect. NGSS asks students to develop a model. The NGSS PE content is aligned to the 2009 ORSS, but the practice is new.
MS-PS1-5. Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	8.2P.1	D/S	D/P	D/S	CCC is energy and matter. The NGSS PE content is aligned to the 2009 ORSS, but the practice is new.
MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	8.2P.2 6-8.4D.1 6-8.4D.2	D/S	N P S	D/S	CCC is energy and matter. This combination of practice and content is new.

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MS-LS1 From Molecules to Organisms: Structures and Processes					
MS-LS1-6. Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	6.2L.2 7.2L.1 7.2L.2 8.2P.2 6-8.3S.2	D/P P P D/P	 P/N	N	Conceptual understanding of photosynthesis is emphasized, not just formula memorization. Energy is implied in 2009 ORSS, but not explicit. CCC is energy and matter.
MS-LS1-7. Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	6.2L.1 7.2L.1 7.2L.2 8.2P.2	P P P P	N	N	Modeling is not in 2009 ORSS. CCC is energy and matter.
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics					
MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	6.2L.2 6-8.3S.2	P	P	N	CCC is cause and effect.
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	6.2L.2 H.2L.2 6-8.3S.2	D/P D/P	P S	N	2009 ORSS 6.2L.2 Does not entirely capture essence of this PE and H.2L.2 goes beyond the PE. CCC is patterns.
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	6.2L.2 7.2L.2 8.2P.1 H.2L.1	D/P P D/P D/P	N	N	Modeling is not in 2009 ORSS. CCC is energy and matter. Some of this content is aligned to 2009 ORSS at the high school level
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	6.2L.2 8.2L.1 6-8.3S.2	D/P D/P	 P/N	N	Practice includes argumentation. CCC is stability and change.
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	7.2E.1 7.2E.3 6-8.4D.2	P P	 P	N	7.2E.1 Could support/set the context for MS-LS2-5 CCC is stability and change.

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MS-ESS2 Earth's Systems					
MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	6.1E.1 7.2E.4 8.2E.2 8.2P.2 H.1E.2 H.2E.1	D/P P D/P D/P D/P D/P	N	N	Developing and using models is not specifically included in 2009 ORSS. 2009 ORSS H.1E.2 + H.2E.1 are strongly aligned.
MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	8.2E.2 7.2E.4 6-8.3S.2 H.1E.2 H.2E.2	D/S S D/P D/S	 P	N	The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE.
MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	8.2E.2 8.2E.4 8.1L.1 8.2L.1 7-8.3S.2 H.2E.2	D/S D/S D/P D/P D/P	 P	N	Aligns to evidence for evolution, natural selection, geologic change in 2009 ORSS. The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE. Aligned to 2009 ORSS "elucidate the history of events on Earth"
MS-ESS3 Earth and Human Activity					
MS-ESS3-1. Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	7.2E.1 6-8.3S.2	P/N	 P	N	The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE.
MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	8.2E.2 6-8.4D.3 7-8.3S.2	D/P/N	 P P	N	"Inform the development of technologies" is new. The 2009 ORSS include many facets of scientific inquiry that are not fully connected to a singular NGSS PE. Connection to engineering design.

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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 S S 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 P 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 P 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:					
7.3S.3 focus is on characteristics of controlled experiments and how theories change over time that are not addressed explicitly in NGSS.					