Oregon Science Content and Assessment Panel

Report to the Oregon State Board of Education and the Department of Education

February 2014

Main Points from Science Panel Work:

* The alignment crosswalks and the proposed state and district level timelines for transition, professional development and implementation including assessment are draft documents. ODE staff and management need to conduct a vetting process to finalize the documents and produce further guidance, communication, and resources as needed. This work will include converting the middle school discipline-specific crosswalk to grade level.
* Initially, it may appear that there are more numerous standards in Next Generation Science Standards (NGSS) than in the 2009 Oregon Science Standards (ORSS). However, in many cases, multiple NGSSs align to one ORSS. The ORSS tend to be more general while the NGSS tend to tease out more specific content and suggests how students can demonstrate depth of knowledge.
* NGSS Content/Cross Cutting Concepts/Practices support the CCSS Mathematics and ELA Content/Practices, and science is an engaging context for reinforcing the concepts of math and ELA.
* It is critical that science instruction occurs at Kindergarten and continues at every grade because it builds the foundation in the learning progression for students on the pathway of K-12 science success.
* The assessment of the NGSS will need to be different from the current science assessment used for OAKS due to the different three-dimensional nature (disciplinary core ideas, cross-cutting concepts and science and engineering practices) of the NGSS.
* The state and districts must provide the necessary support, time, and resources needed for planning and professional development to ensure successful transition and implementation of these new science standards.
* The Science Panel recommends that the Oregon State Board of Education and ODE produce a white paper to inform the legislature and all citizens regarding the importance of adopting these new science standards and providing a high quality science education to all Oregon students in order to prepare them for Careers, College, and Citizenship to meet the 40-40-20 goal and to ensure each student is poised for a promising future.

Overview of Content/Practices/Cross Cutting Concept changes:

* New content:
  + Waves at 1st and 4th grades.
  + Earth and human activity at 3rd grade.
  + Equilibrium and closed systems; interaction of magnetic field and electric current; digital transmission and waves; electromagnetic radiation; and using statistics and probability in population and diversity studies at high school.
* Most standards in the K-5 grades remained intact, the greatest changes are the instructional approaches moving from content based to more performance based. In NGSS, students are asked to understand, use, and apply scientific processes to a greater degree than in the current Oregon science standards.
* Some science content has moved from high school to middle school (ex. fields in forces and stored energy in systems; and cycling of matter, flow of energy, and geoscience processes in systems).
* Some science content is eliminated from middle school (ex. electricity and magnetism are included, but static and current electricity, and series and parallel electrical circuits are not covered).
* There is a good alignment in the practices between the 2009 ORSS and the NGSS. Developing and Using Models, Using Mathematics and Computational Thinking, and Engaging in Argument from Evidence are newly explicitly referenced. In addition, NGSS demands a higher level of rigor to develop critical thinking skills.
* The Cross Cutting Concepts are now explicitly stated in the standards, while in the 2009 ORSS most were stated in the Core Standards Statements and implied in the grade level standards.