

STATE BOARD OF EDUCATION

HEARING TYPE: ___X___ INFORMATION

DATE: January 9-10, 2008

SUBJECT: **SCIENCE UPDATE: STANDARDS REVIEW AND GRADUATION
REQUIREMENTS OF OTHER STATES**

SERVICE UNIT: Ms. Edie Harding, Executive Director
State Board of Education

PRESENTER: Mr. David Heil, President and Project Co-Director,
 David Heil & Associates
 Dr. Rodger Bybee, Project Co-Director, David Heil & Associates
 Mr. Harold Pratt, Project Co-Director, David Heil & Associates
 Ms. Sue Thilo, Member, Idaho State Board of Education
 Ms. Susan Bodary, Executive Director, EDvention

BACKGROUND:

Science Standards Review

David Heil, Rodger Bybee and Harold Pratt will summarize the input provided by the Science Standards Advisory Panel gathered at the first panel meeting held on December 18, 2007, and will outline the next steps in the review process.

Science Graduation Requirements

Two representatives from states (Idaho and Ohio) that have recently changed their science graduation requirements to mandate three credits for future classes, will speak to the Board about the changes that were made and the rationale behind them.

Sue Thilo (Idaho) is one of the eight members of the Idaho State Board of Education. Sue chaired the Board's Statewide Task Force on Accelerated Learning and Preparation for Post-Secondary Education that developed recommendations for high school redesign in Idaho.

Susan Bodary (Ohio) is the Executive Director for EDvention, a P-20 collaborative to accelerate Science, Technology, Engineering, and Mathematics (STEM) development in the Dayton, Ohio area. She is the former Education Policy Advisor to Governor Bob Taft and was involved in creating Ohio's new graduation requirements, the Ohio Core.



Washington State
Board of Education



Working to Raise Student Achievement Dramatically

Science Standards Review Update

The Board hired a consultant, David Heil and Associates, to perform the work of the science standards review and selected 19 people from a field of 68 applicants to serve on the advisory panel. The panel represents years of science-related experience and diverse perspectives and includes practicing scientists, educators, a school board member and parents from different parts of the state. Panel members will provide formal feedback and guidance to the external consultant as the review progresses.

The panel met for the first time on December 18, 2007. Jeff Vincent gave opening remarks and set the stage for the importance of the work. The leadership team of David Heil, Rodger Bybee, and Harold Pratt facilitated the rest of the meeting. They outlined a brief history of the standards movement, then asked the panel to assess the strengths and weaknesses of the current Washington state science standards. The team also provided input on key considerations for Washington's science standards and reviewed the rationale for selecting Massachusetts, California, Colorado (all Global Challenge states) and Singapore and Finland as the states and countries against which Washington's standards would be compared. The meeting concluded with a discussion and suggested definitions of the nine criteria (clarity, rigor, content, coherence from grade to grade, balance, depth, specificity, accessibility, and measurability) that will be used to evaluate the standards.

The next meeting of the science advisory panel will be held on February 28. The consultant will be prepared at the March Board meeting to outline preliminary, draft recommendations for revisions to the science standards.

Science Graduation Requirements

As the Board embarks on its review of graduation requirements, credit requirements for all subject areas will be analyzed critically. Currently, Washington requires all students to earn two credits of science, with one being a lab science.

When the Board reviewed graduation requirements for all districts, it found that the vast majority of districts—198 or 80% of the 246 districts with high schools—required students to earn only the state two-credit minimum.

In order to align with Washington’s public baccalaureate’s minimum college admissions standards, the Board would need to change the second credit of science to an algebra-based, lab science. But are two credits sufficient? What is a lab science? What is an algebra-based lab science? What are the implications of requiring more lab-based credits? What are the implications of requiring more credits in science? These are all questions that the Board will need to consider as it evaluates Washington’s science requirements.

National Picture

Graduation credit requirements in science are distributed nationally in this way:

Science Graduation Requirements of 50 States and District of Columbia

State Credit Requirement	Number of States with this Requirement in 2008	Number of States with this Requirement in 2009+
0	7	5
1	1	0
2	17	11
2-3 or 2-4	2	2
3	22	28
3-4	1	2
4	1	3

States with a range of requirements (2-3, 2-4, or 3-4) require different numbers of credits for graduation depending on which pathway the student chooses. For instance, South Dakota requires two credits of students who take the *standard* curriculum but three credits of those who take the *recommended* curriculum. Students, with the permission of school staff and their parents, have to opt out of the recommended curriculum.

Twenty-four (56%) of the 43 states with state-mandated graduation requirements currently require three or more credits. Two states (Iowa and Michigan) are instituting requirements for the first time in 2011. In 2009 or later, 33 (73%) of the 45 states with state-mandated graduation requirements will require three or more credits.

Twenty-one states specify at least one credit of lab, although in some cases (Arkansas, Indiana, Oklahoma, and South Dakota), the number of lab-based courses depends on the type of pathway students choose.

The Idaho and Ohio Experience

Staff identified two states that have recently made changes to their science graduation requirements. **Idaho** requires two credits of science, including one lab-based science. Effective with the class of 2013, students will be asked to complete three credits of science, including two lab-based credits. **Ohio** requires three credits of science, including one credit each of biological and physical sciences. Effective with the class of 2014, students will be asked to complete three lab- and inquiry-based science credits. The number of credits didn't change, but the specifications that they must be lab- and inquiry-based were added.

Representatives from both states will speak about the rationale, issues, and process for those changes.

Idaho

Idaho, which currently requires 21 credits, has increased the credit requirements to 23, effective for the class of 2013. Those requirements will include:

Idaho Graduation Requirements for the Class of 2013

Subject	Credits	Notes
Science	3.0	2 must be lab
English	4.0	
Math	3.0	Classes must be tied to Algebra I and geometry standards, and include 1 credit in the senior year. Students must take pre-algebra before entering ninth grade.
Social Studies	2.5	Government, history, and economics
Health	0.5	
Physical Education	0.5	
Humanities, including fine art and foreign language	1.0	
District-determined electives	8.5	
Total	23.0	

Effective with the class of 2013, students must complete a senior project that includes a research paper and oral presentation. All students must take the ACT SAT or Compass by the end of 11th grade.

Ohio (excerpted from the Ohio Core Fact Sheet)

Beginning with the high school graduating class of 2014, students will be required to complete 20 credits of the Ohio Core.

Ohio Graduation Requirements for the Class of 2014

Subject	Credits	Notes
Science	3.0	Inquiry-based laboratory experience, including physical science, biology, and advanced study in one or more of the following sciences: chemistry, physics or other physical science; advanced biology or other life science; astronomy, physical geology or other earth or space science
English	4.0	
Math	4.0	Including Algebra II or its equivalent
Social Studies	3.0	American history and government
Health	0.5	
Physical Education	0.5	
Foreign language, fine arts, business, technology, and Career Technical	5	Select any combination of electives.
Total	20	

Schools are to formally integrate economics/financial literacy into the social studies requirement or as a stand-alone class. Economic and financial literacy standards already exist within the social studies academic content standards.

Students must complete two semesters of fine arts sometime between grades 7 and 12 as a requirement of graduation.

Recognizing the importance of foreign language in today's competitive global economy, a *Foreign Language Education Council*, comprised of education and business leaders was tasked with developing and recommending a plan for foreign language learning across Ohio's P-16 education spectrum.

No changes were made to the total credits (20) required to graduate. Until 2015, students may choose to opt out of the Ohio Core after the end of their second year of high school and graduate under the requirements of current law.