

MATH AND SCIENCE UPDATE

BACKGROUND

The State Board of Education (SBE) has been engaged in a variety of initiatives to lay the foundation for improving Washington students' math and science achievement. Revised math and science standards, new math graduation requirements, proposed new science graduation requirements, review of math and science curriculum materials, continued support for math and science assessment as a graduation requirement, and establishment of assessment cut scores are the primary ways the SBE has been involved.

The SBE continues to support the implementation of math and science assessments as a graduation requirement. Students in the Class of 2013 are the first to be required to pass reading, writing, math, and science assessments. The Office of Superintendent of Public Instruction (OSPI) is moving toward math end-of-course (EOC) assessments in 2011. Students will take an EOC in Algebra I or Integrated Mathematics I, and in Geometry or Integrated Mathematics II. Some of the planned math assessment changes and timelines are listed in the table below.

Mathematics High School Proficiency Exam (HSPE)¹

Characteristic	Timeline and Details
Alignment to content standards	2010 Math HSPE aligned to old math content standards; scores and scales have same meaning as previous assessments. End-of-course tests begin in 2011 and will be aligned to new content standards.
Reduced testing time	Spring 2010 Math HSPE testing time of about 120 minutes—HSPE may be given in one or two sessions (single-day testing), for a total administration time of about three hours.
Fewer constructed response items	2010 Math HSPE has no four-point constructed response items; limit of 25 percent of points from two-point items.
Online testing	2011 EOC math tests will be paper-and-pencil and given in intact classrooms; make-up math tests will be administered in 2012 and will be online and comprehensive

OSPI may introduce end-of-course assessments in biology/life sciences in the 2011-2012 academic year. Until then, students will take comprehensive science assessments aligned to the former standards. Additional end-of-course assessments in other science content areas may be developed.² End-of-course assessments “demand greater statewide consistency in high

¹ <http://www.k12.wa.us/Mathematics/pubdocs/Changesfor2010.pdf>

² As of this writing, language in the House version of the Senate budget directs the superintendent of public instruction, in consultation with the state board of education, to develop a statewide high school end-of-course assessment measuring student achievement of the state science standards in biology to be implemented statewide in the 2011-12 school year. The budget also directs the superintendent of public instruction to recommend, by December 1, 2010, whether additional end-of-course assessments in science should be developed and in which content areas.

school course offerings”.³ Because they are usually administered at the completion of the subject studied and can be linked more directly with curriculum, students may have greater incentive and opportunity to demonstrate the relevant knowledge and skills.

OSPI UPDATE ON MATH AND SCIENCE INITIATIVES

OSPI is collaborating with many groups that play a significant role in improving mathematics teaching and learning: higher education (Title II-B, Math/Science Partnership grants); public/private partnerships (LASER, Transition Math Project, STEM Center); Educational Service District (ESD) math and science coordinators; district and school improvement, and Career and Technical Education (CTE). One of the primary goals of the OSPI math and science teams has been to reach out to partners to collaborate, inform, and when possible, align work so that a more coherent system can be established.

In January 2010, OSPI presented to the SBE five key recommendations for improving student achievement in math and science. While several of the recommendations hinge on the receipt of additional funding (either through the state and/or the Race to the Top fund), work continues to move forward with the benefit of existing resources. Following is a summary of current work and progress on each of the recommendations presented to the SBE in January:

Recommendation One: Focus on improving core classroom instruction in math and science.

OSPI is moving ahead with this initiative in three ways:

1. Develop and deliver support for implementing current math and science standards, instructional materials, and assessments.

In collaboration with ESD math and science coordinators, as well as with various math and science content-specific stakeholder groups, professional development materials have been developed and are being delivered across the state on the revised math and science standards. For example:

- In mathematics, “like user groups” are being formed across the state, supported regionally by ESD mathematics coordinators. These user groups have created wikis⁴ that can be accessed by any teacher across the state.
- In science, the LASER network is providing teachers with additional in-depth information about the alignment of current instructional materials.
- Within OSPI, CTE and the math division of teaching and learning are continuing to align alternate classes to traditional math experiences. Progress also continues on a CTE/Algebra II course that will allow students to experience Algebra II concepts in a more hands-on format.

³ Heil, D., Bybee, R.W., Pratt, H.A. and McCracken, K. October 28, 2008. *Implications of Using Science End-of-Course Assessments for High School Exit Exams.*
<http://www.sbe.wa.gov/documents/EOC%20Briefing%20Paper2.pdf>

⁴ A **wiki** is a website that allows the easy creation and editing of any number of interlinked web pages via a web browser. Teachers can upload documents at the WA site. See: <http://washington-bofproject.pbworks.com/>

In addition, state resources have been provided to build a comprehensive formative assessment system based on existing state learning standards. This work will expand in 2010-2011.

OSPI is considering ways to support high schools as they prepare for end-of course assessments in math, in 2010–2011 and in science in 2011–2012. OSPI will be developing:

- Supports intended to communicate the specifics of the test, both with the test and item specifications, and other materials that explain the type of items the students can expect to see on the exams.
- Materials that address gaps in the standards that occur across all instructional materials so not every teacher needs to recreate the same material.
- Crosswalks to support the transition from the state comprehensive assessment.

2. Pilot, refine, and scale the mathematics improvement framework.

The mathematics improvement framework, a system guide for improving math instruction within a district, is a result of collaboration among school improvement (OSPI), the math division of teaching and learning (OSPI) and ESD math coordinators. Significant input from stakeholders has shaped the work to date. The framework is being piloted through school improvement. While still in draft form, it represents work that will be supported throughout the state.

3. Align with common core standards and assessments.

OSPI will analyze and compare common core and existing state standards. OSPI will also take the lead in working within Washington and with other states to:

- Build implementation supports.
- Consider the subsequent alignment of instructional materials.
- Provide funds to support the purchase of textbooks and instructional materials that are highly aligned to standards in math and science.
- Develop an online, formative assessment system for math and science.

Recommendation Two: Ensure all elementary education teachers, new and veteran, have strong content knowledge and instructional practice in math and science. Increase district hiring and alternative route preparation of recent math and science graduates and professionals early in their career, easing transition to a career in teaching.

The Professional Educator Standards Board (PESB) will streamline rules that govern granting teaching certification for math and science professionals who have a desire to change careers and enter teaching. In addition, recruitment of math and science majors to become teachers and improvement of pre-service training for elementary school teachers continues to be a priority.

Recommendation Three: Recommend that science be taught a minimum of 100 minutes per week in grades 1 and 2; 150 minutes per week in grades 3–5; and 200 minutes per week in grades 6–8.

OSPI will continue to advocate for and offer support to elementary and middle schools for providing comprehensive science instruction at the elementary and middle school levels.

Recommendation Four: Support district implementation of stronger math and science programs by increasing professional development of teachers through leveraging public and private resources to expand statewide system improvement initiatives.

OSPI is supporting elementary teachers' content knowledge by pursuing an Elementary Mathematics Specialty endorsement in partnership with PESB, ESD mathematics coordinators and higher education.

OSPI has funded math and science coaches to provide job-embedded ongoing professional development to 18 districts around the state. OSPI also has provided regional and statewide trainings to hundreds of math and science coaches and teacher/leaders. As a result, there is now a leadership cadre of math and science teacher-leaders. Each ESD augments state efforts by supporting math and science teacher-leaders in its own region.

OSPI will continue developing intentional partnerships to deliver meaningful professional development in both math and science. A November 2010 statewide math/science "coach/mentor" conference, held in cooperation with the Center for Strengthening the Teaching Profession (CSTP), is a notable example.

Recommendation Five: Introduce policy initiatives that will support new programs designed to promote early learning in math and science. Develop a math training program for early learning providers that focus on numbers, geometry/spatial thinking, and measurement.

The OSPI mathematics division is forging partnerships with early learning stakeholders to advocate for the importance of numeracy in the early ages. Informational brochures will soon be available that will give parents and early learning providers key information on how to support early numeracy with children in everyday experiences. Early numeracy efforts are being supported through implementation of the State Early Learning Plan, more specifically through initial "Early Learning Implementation Grants" that will be awarded in spring 2010. With private support, these efforts may continue.

Recommendation Six: Make it easier for districts to join multi-district cooperatives for the purposes of beginning a STEM focused high school, irrespective of existing district boundaries, and continue to promote program development at skill centers that focus on STEM-related training.

Efforts will continue to move this forward should resources allow.

WASHINGTON STEM CENTER

The Washington Science, Technology, Engineering and Math (STEM) Center will establish a statewide focal point for supporting and coordinating state, regional, and local STEM teaching programs, practices, and policies. The Washington Roundtable and the Partnership for Learning are the catalysts for the development of the STEM Center.

The STEM Center has six guiding principles:

1. Focus on strengthening instruction.
2. Identify high quality programs that are scalable and equitable.

3. Act collaboratively by engaging K-12 districts and schools, institutions of higher education, business and industry, and policymakers.
4. Be outcomes-driven and research-based.
5. Be innovative.
6. Take a coherent, coordinated and comprehensive approach to reform.

The STEM Center is currently recruiting for a chief executive officer with the goal of making an offer in April, 2010. In the meantime, it is engaged in fundraising and in discussion of the STEM Center potential role in the state's Race to the Top application.

EXPECTED ACTION

None. Information only.