

High School Science Assessment Update Biology End-of-Course Exam

OSPI Science Assessment Staff

WERA Conference, SeaTac WA, December 2011



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Topics:

- General Overview
- Test Development
- The Assessments
- Standard Setting
- Resources Available
- Upcoming Events



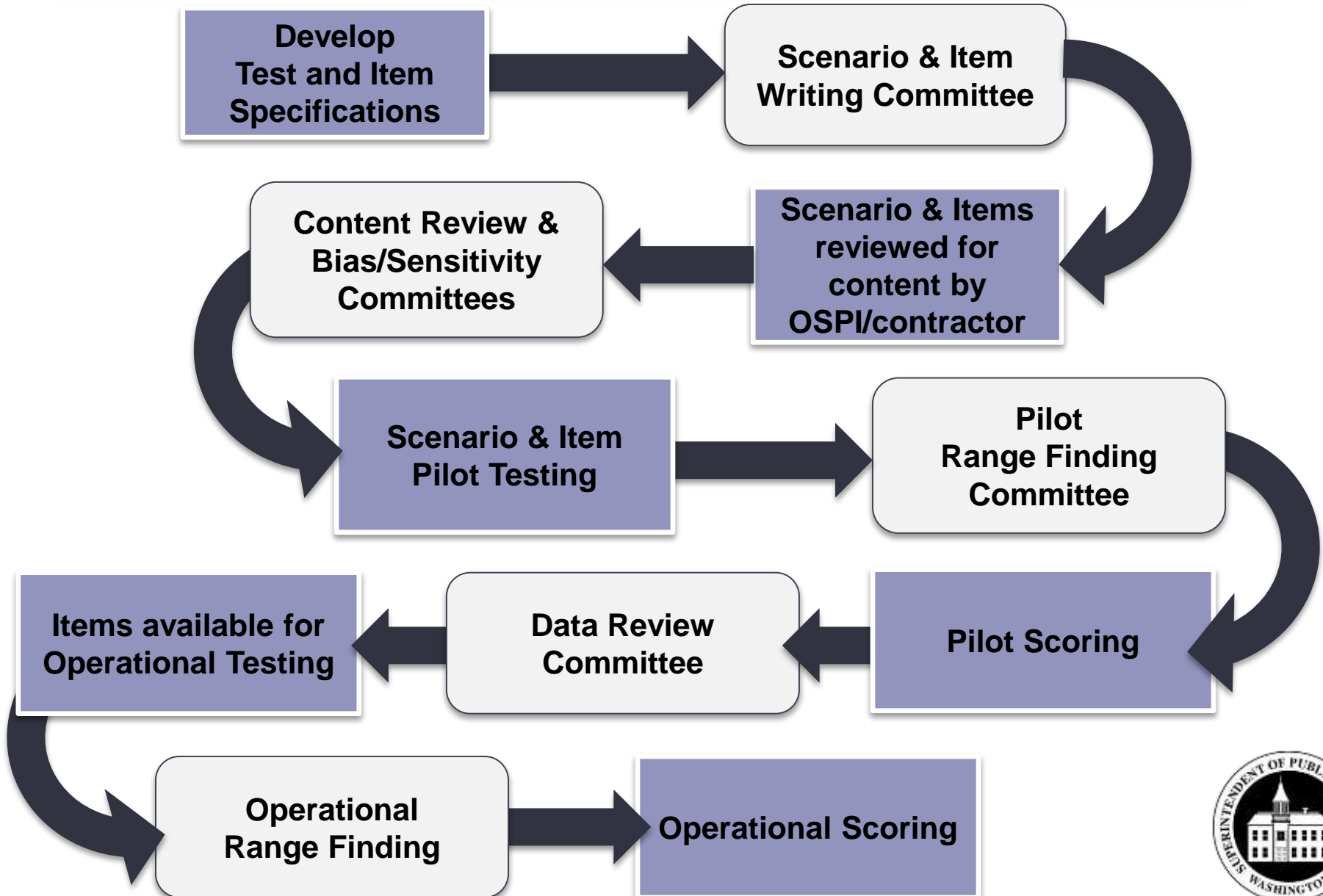
Big Ideas in Science Standards

EALRs 1-3 Crosscutting Concepts and Abilities	EALR 4 Domains of Science
<p>EALR 1 Systems</p> <p>...is a way of thinking that makes it possible to analyze and understand complex phenomena.</p>	<p>Physical Science</p> <p>Force and Motion Matter: Properties and Change Energy: Transfer, Transformation and Conservation</p>
<p>EALR 2 Inquiry</p> <p>...is a process of asking and answering questions about the natural world that forms the bedrock of science.</p>	<p>Earth and Space Science</p> <p>Earth and Space Earth Systems, Structures and Processes Earth History</p>
<p>EALR 3 Application</p> <p>...is about the interaction between science and technology, and how both can help solve real-world problems.</p>	<p>Life Science</p> <p>Structures & Functions of Living Systems Ecosystems Biological Evolution</p>

Test Development from Scenario Proposal to Operational Exam



Science Assessment Development Cycle



Test and Item Specifications

State of Washington
Office of Superintendent of Public Instruction

OSPI

Home | Certification | Offices & Programs | Teaching & Learning | Assessment | Finance & Grants | Research & Reports

Science

Learning Standards

Assessments

Mathematics & Science Partnership

Resources

Contact Information

Test and Item Specifications

The Biology End-of-Course Exam in 2012 will assess the Washington K-12 Science Learning Standards adopted in June 2009.

- Biology Test and Item Specifications (PDF, 40 pages) (Word) - Updated with test map October 11, 2011

The Grades 5 and 12 Science Learning Standards will assess the Washington K-12 Science Learning Standards adopted in June 2009.

- Grade 5 Test and Item Specifications
- Grade 8 Test and Item Specifications

July 22, 2011
October 20, 2011

Washington Comprehensive Assessment Program

Office of Superintendent of Public Instruction

Test and Item Specifications

Biology

Item Specifications: Biology

EALR 1: Systems
Big Idea: Systems (SYS)
Core Content: Predictability and Feedback

Stimulus and Stem Rules

- A stimulus or stem will include an adequate description of an appropriate life science system.

Item Specifications

	Items may ask students to:	C.C.	Format
9-12 SYSA Feedback	(1) Describe feedback as a process in which the output of a given system provides information used to regulate the operation of the system.	2	MC
	(2) Determine whether a given system involves positive feedback or negative feedback.	2	MC CP
	(3) Describe the regulatory inputs and/or outputs of a given positive feedback system (e.g., after a cat, a clotting process cascades to form a scab; increased CO ₂ and methane inputs results in higher temperatures; decreased light reflected to space, ice caps melting, and sea levels rising).	3	MC SA



Test and Item Specifications

- Guidelines for development of scenarios
- Test specifications (a.k.a. “test map”)
- Item specifications
 - Specific text describing what an item can ask or direct students to do
 - Notation: LS3B(1) is the first item specification for the content standard LS3B.
- Vocabulary list
- Progression of variables language
- Cognitive complexity



Scenarios and Items

- Scenarios provide context for a set of items
 - Systems, Inquiry, and Application
 - Life Science
- Items associated with a scenario cover a range of standards & range of cognitive complexity
- Items not connected to a scenario are called “stand alone” items, and are clearly marked for students



What is a “scenario”?

- A description of a biological system, sometimes involving an investigation or the technological design process
- Establishes the context for a set of items that follows
- One or two pages long
- Includes a diagram and/or a table



Types of scenarios

Systems	Inquiry	Application
<ul style="list-style-type: none">• Describe a living system.• May include systematic observations, models, or open-ended explorations of a system.	<ul style="list-style-type: none">• Describe an investigation into a living system.• Can be either controlled experiments or field studies and model age-appropriate investigations.	<ul style="list-style-type: none">• Describe a technological design process students used to solve a problem.• The problem must be one that involves a living system.



From WASL to High School Proficiency Exam to Biology End-of-Course

High School	2009 WASL	2010 HSPE	2011 HSPE	2012 EOC
Multiple Choice/ Completion	28	35	35	35
Short Answer	11	5	5	5
Extended Response	3	0	0	0
% Points from MC	45%	78%	78%	78%



Biology EOC Test Map

EALR	Percent of EOC
1: Systems (crossed with Life Science and alone)	At least 15
2: Inquiry (crossed with Life Science and alone)	20 – 25
3: Application (crossed with Life Science and alone)	15
4: Life science domain of EALR 4 (alone)	45 – 50

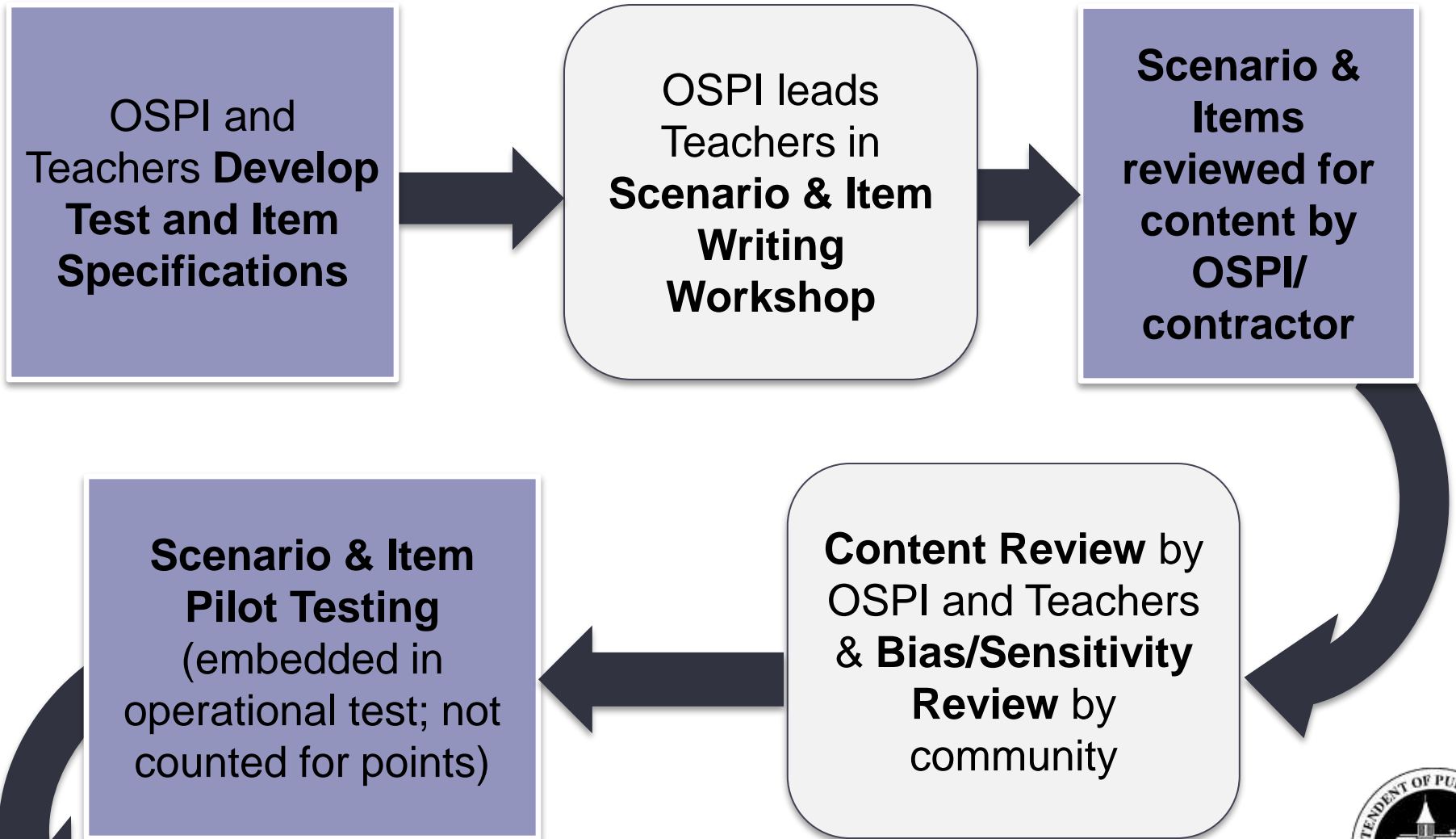


Biology EOC Test Map

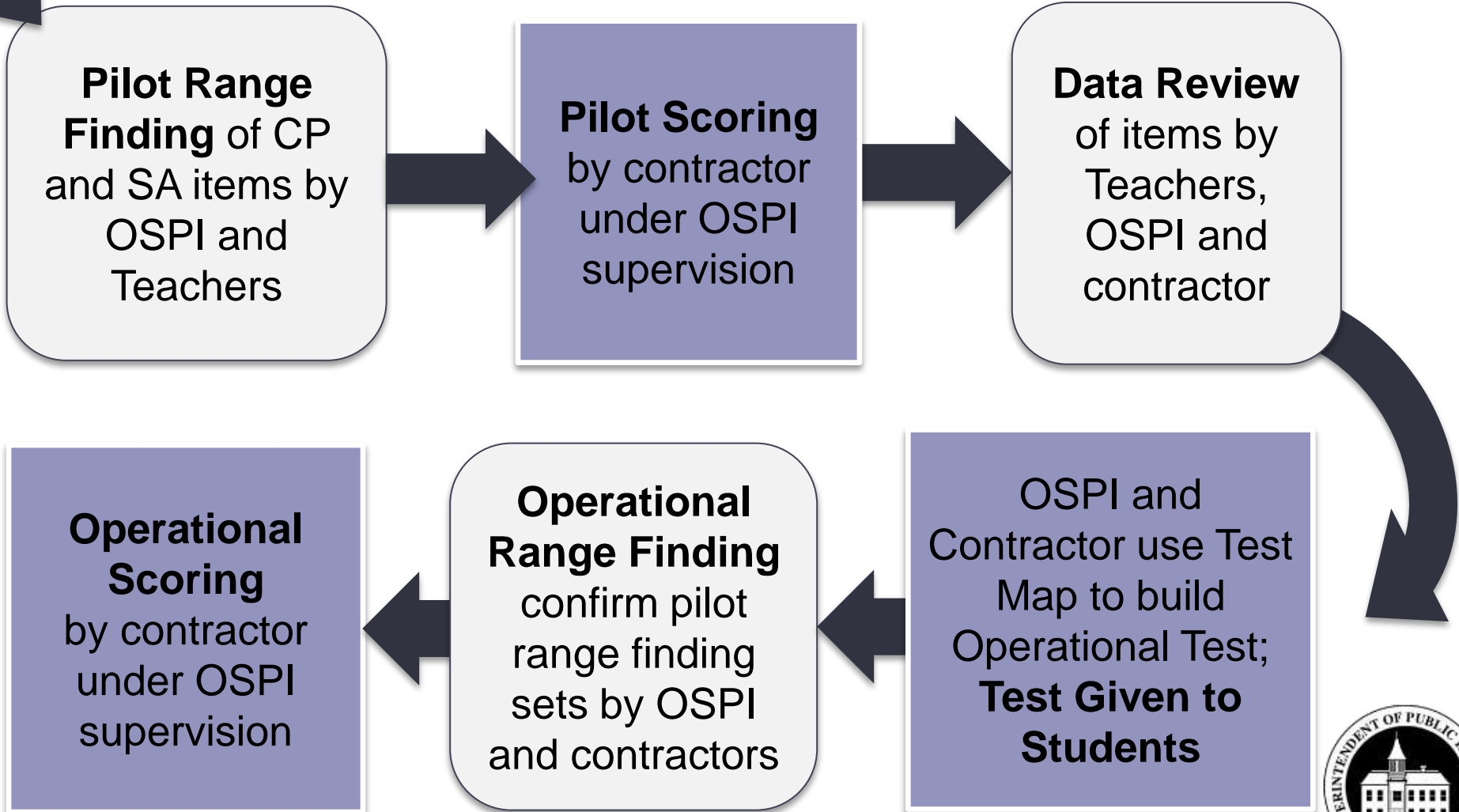
Life Science Domain of EALR 4	Percent of EALR 4 Items	Percent of EOC Points
Processes in cells (LS1)	40-45	20-23
Maintenance and stability of populations (LS2)	30-35	15-18
Mechanisms of Evolution (LS3)	25-30	14-16



Science Assessment Development Cycle (a)



Science Assessment Development Cycle (b)



The Assessments:

- Measurement of Student Progress (MSP)
 - Grades 5 & 8
- Biology End-of-Course (EOC) Exam
 - High School



MSP Number and Types of Items

Item Type	Grade 5	Grade 8
Multiple Choice	20-25	24-29
Completion	1-6	1-6
Short Answer	4	5
Total Items	30	35
Total Points	34	40
Pilot Items	5	5



Biology EOC Number and Types of Items

Item Type	Biology EOC
Multiple Choice	30-34
Completion	1-5
Short Answer	5
Total Items	40
Total Points	45
Pilot Items	5



Who Takes the Biology EOC?

- **Students in the class of 2014** (current 10th graders) are required to take the biology EOC in spring 2012
- **Students in the class of 2015** (current 9th)
 - Students taking a biology course in 2011-12 will take the biology EOC in spring 2012.
 - Students not taking a biology course in 2011-12 will take the biology EOC in spring 2013.



How will the Biology EOC be administered?

- Testing window: **May 7** through **June 15, 2012**
- Locally determined schedule, **during last three weeks** of the course
- May be administered in **three 50 minute class** settings, or in a **single session** of approximately **150 minutes**
- First retake opportunity will be **Winter 2013**



Standard Setting for the Biology End-of Course Exam



Science Standard Setting Plan

Date Event

June 2009 New Science standards approved

April 2011 Spring 2011 HSPE; New items piloted

June 2011 Test Map meeting

Sept 2011 Spring 2012 tests built

Oct 2011 Performance Level Descriptors (PLDs) developed

Science Standard Setting Plan

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Feb/Mar 2012 Teachers from across state trained on how to use PLDs to participate in Contrasting Groups Study (CGS)

Winter/Spr2012 NTAC and SBE formally approve standard setting plan

April 2012 Teachers participate in CGS by providing ratings of students

May-June 2012 Spring 2012 Biology EOC administered



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July/Aug 2012 Standard Setting events:

--Standard Setting Committee (use “Bookmark process”)

--“Policy panel” recommendations

--NTAC certifies the planned process was followed

Aug 2012 SBE Sets Achievement Standards (Reviews all recommendations)



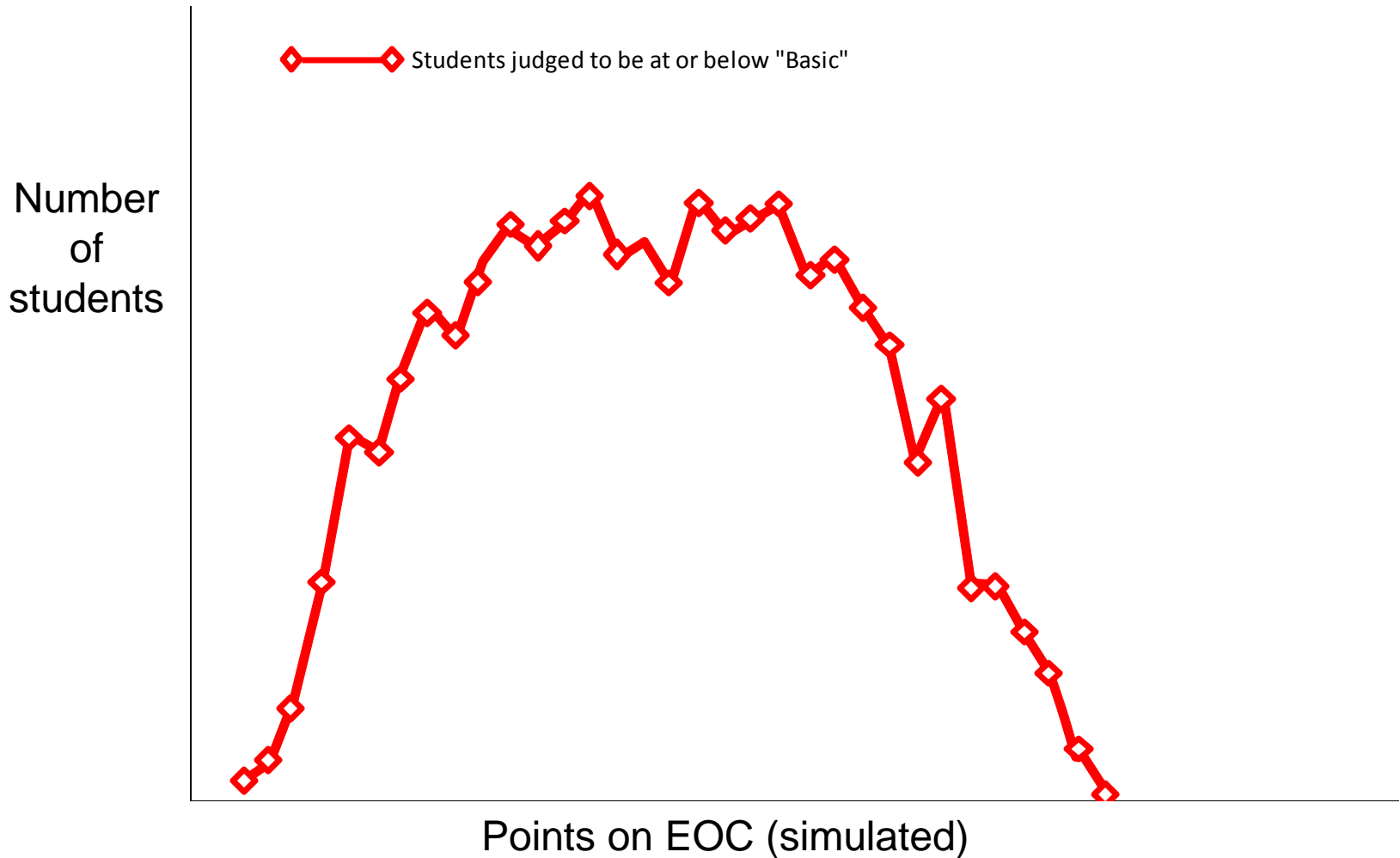
“*Contrasting Groups*” method affords broader involvement in standard setting

Everyone in the state who teaches Biology is invited to help set the performance standards.

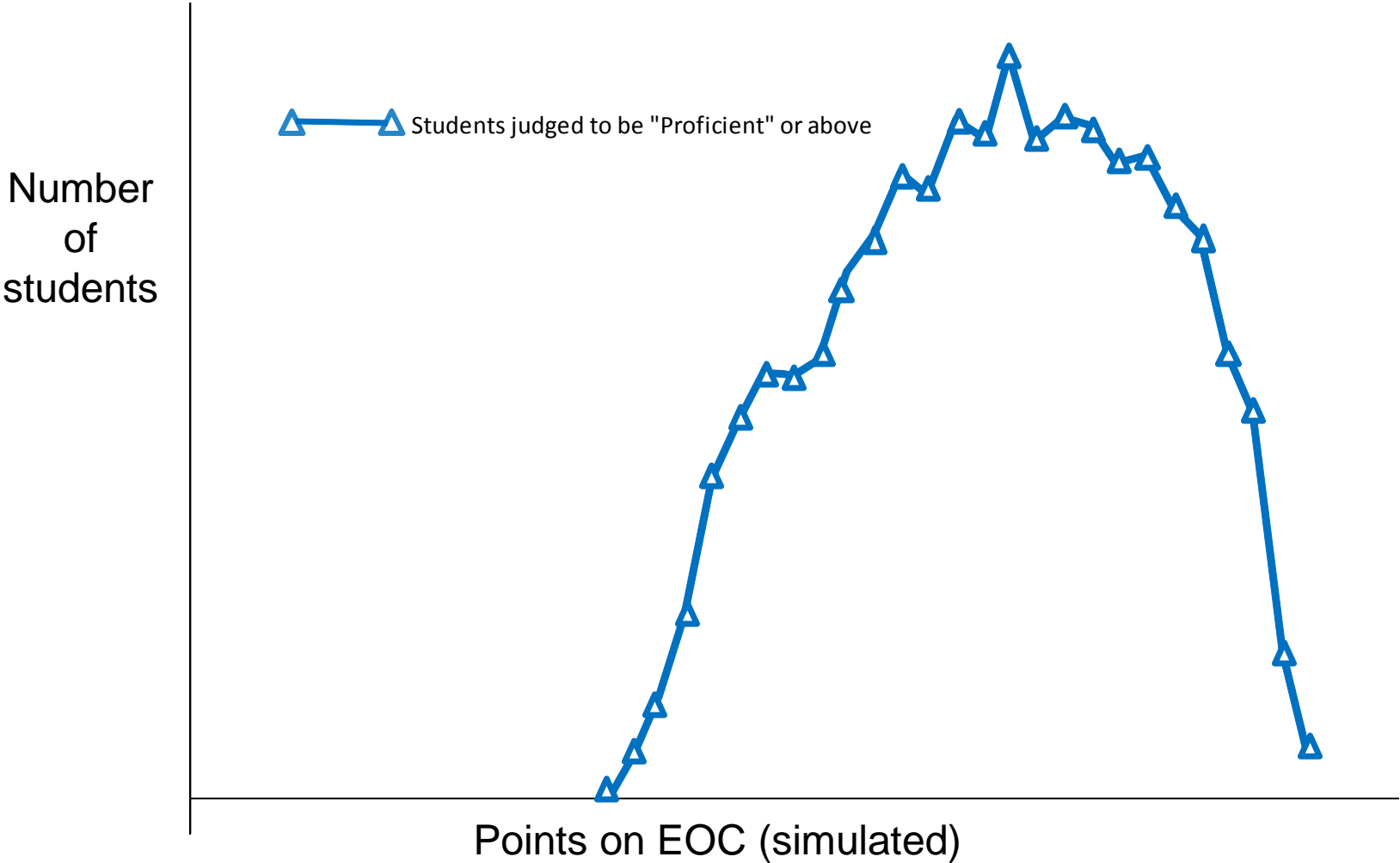
- Performance Level Descriptors (PLDs) are developed for “Basic” and “Proficient”
- Web-based training on PLDs is provided to participating teachers
- In April, participating teachers judge each of their students as being “Basic or below” or “Proficient or above”
- Two distributions of scores are produced: Scores obtained by students rated as “Basic”, and scores for “Proficient”
- Where the two distributions merge represents the separation point between “Basic” and “Proficient.”



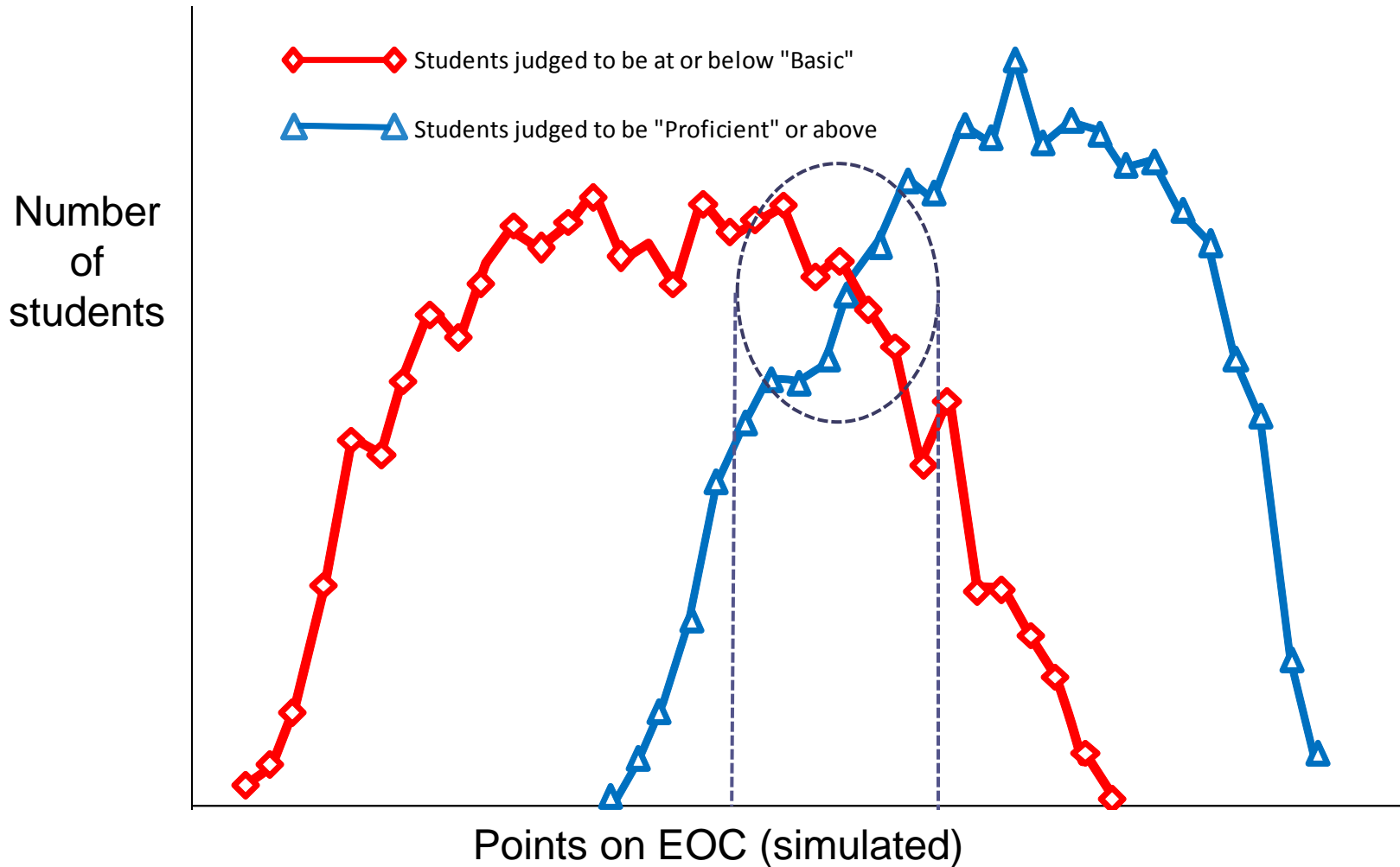
Students rated as “Basic or below” using criteria in PLD for Basic



Students rated as “Proficient or above” using criteria in PLD for Proficient



Intersection indicates a region for where “Basic” separates from “Proficient”



Biology EOC Standard Setting Events

- PLD Training – Available via Moodle, Feb. 1, 2012
 - Learn to use evidence to evaluate Biology students' proficiency
 - Takes 3 hours; 3 free clock hours are available
 - To sign up, go to the link and create an account
 - <http://moodle.ospi.k12.wa.us/>
- Contrasting Groups Study – Available via EDS in April
 - After completing the PLD Training, Biology teachers are asked to predict their students' performance on the Biology EOC
 - Participating Biology teachers can gain access to the EDS application by contacting a District Assessment Coordinator
- Standard Setting – July 30 to Aug. 1, 2012



OSPI Resources

The screenshot shows the OSPI website homepage. At the top left is the OSPI logo and the text "State of Washington Office of Superintendent of Public Instruction". To the right are links for "Languages", "A - Z Index", and "Print Ver". Below this is a navigation menu with "Home", "Certification", "Offices & Programs", "Teaching & Learning" (circled in red), "Assessment", "Finance & iGrants", and "Research & Reports".

The main content area is divided into three columns:

- Features:** A green box titled "Learn About Math End-of-Course Exams" with a background image of a ruler and a protractor.
- What's New:** A light green box containing three news items:
 - Seattle's Madison Middle School Wins National Award
 - Washington's Scores Above Nation on NAEP Reading, Math
 - Dorn issued statement on Gov. Chris Gregoire's initial budget proposalA "More News" link is at the bottom right.
- About OSPI:** A white box with a photo of State Superintendent Randy Dorn. Text reads "OSPI oversees K-12 public education in Washington state." Below are links: "What We Do", "Priorities", "Contact Us", "Jobs | Contracts", and "Newsroom".

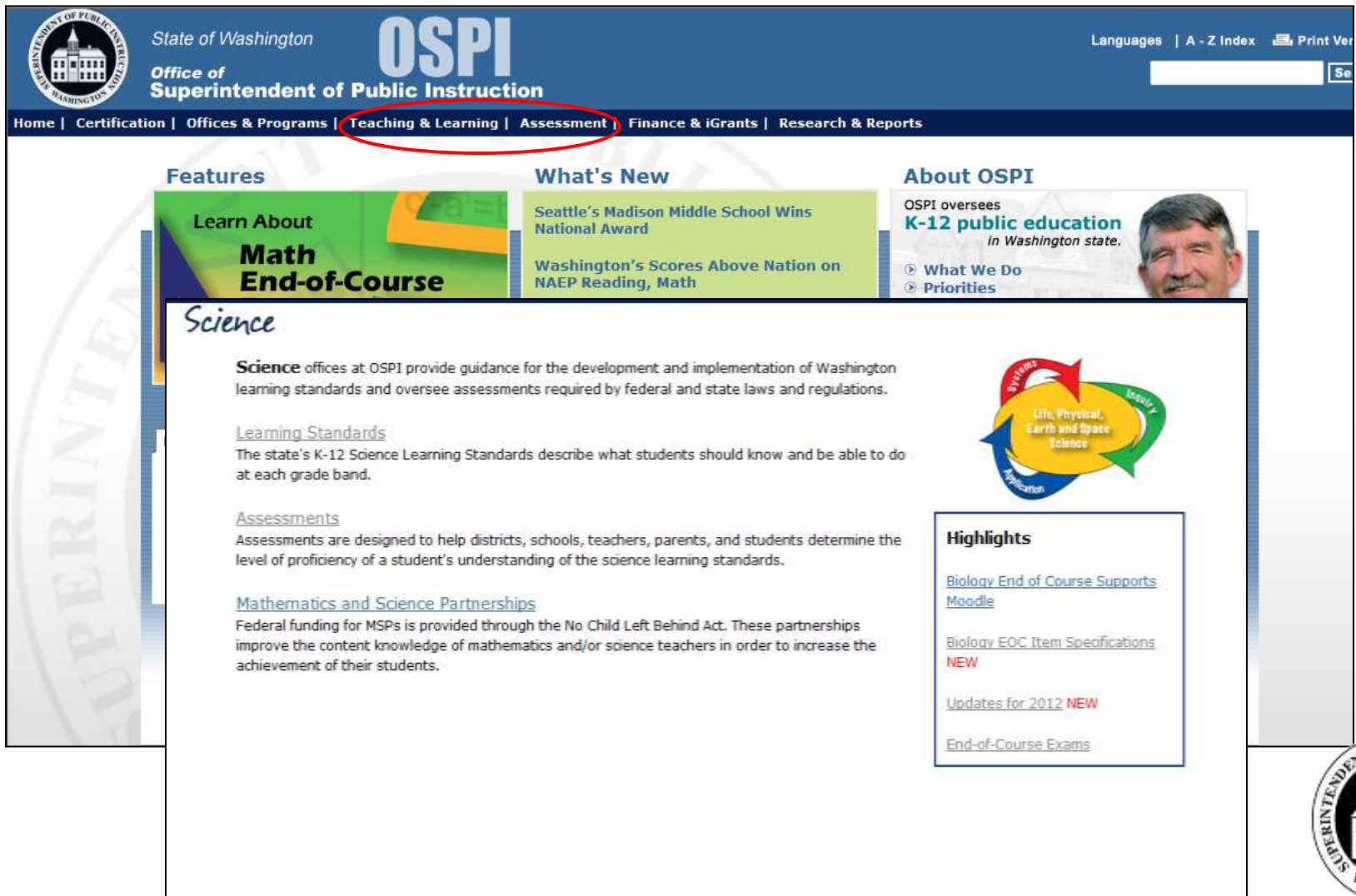
Below the main content is a "Helpful Links" section with tabs for "Family Resources", "Teacher Tools", "FAQs", "Bulletins|Memos", and "Events". The "Helpful Links" tab is active, showing a grid of links:

- Maps of Districts and Schools
- Teacher Certification and Renewal
- Learning Standards
- Apportionment and Financial Services
- State Testing: MSP and HSPE
- End-of-Course Exams
- Special Education
- Graduation Requirements
- Student Transportation
- Media/Communications
- School Breaks
- Common Core Standards
- School District Revenues
- Best Practices for School Districts
- WaKIDS

At the bottom are several resource icons: "Online Grade Level Standards & Resources", "School Safety Center", "Apprentice Utilization", "Información para Padres en Español", "Washington's Innovative Schools", "Offices and Programs", "State Report Card", "Maps & Web sites Districts", "Education Recovery", and "Partners in Education".



OSPI Resources



The image is a screenshot of the OSPI (Office of Superintendent of Public Instruction) website. The top navigation bar includes the OSPI logo, the text 'State of Washington Office of Superintendent of Public Instruction', and a search bar. The main navigation menu is located below the header, with 'Teaching & Learning' highlighted by a red circle. The page content is organized into several sections: 'Features' with a 'Learn About Math End-of-Course' link, 'What's New' with news items about Seattle's Madison Middle School and Washington's NAEP scores, and 'About OSPI' with a photo of a man and links for 'What We Do' and 'Priorities'. The main content area is titled 'Science' and contains text about science offices, learning standards, assessments, and mathematics/science partnerships. A circular diagram on the right side of the page represents the 'Life, Physical, Earth and Space Science' system, with arrows indicating a cycle between 'Systems', 'Quality', and 'Application'. A 'Highlights' box on the right lists 'Biology End of Course Supports Moodle', 'Biology EOC Item Specifications NEW', 'Updates for 2012 NEW', and 'End-of-Course Exams'. The OSPI logo is also present in the bottom right corner.

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Features

Learn About
**Math
End-of-Course**

What's New

Seattle's Madison Middle School Wins National Award

Washington's Scores Above Nation on NAEP Reading, Math

About OSPI

OSPI oversees
K-12 public education
in Washington state.

What We Do
Priorities

Science

Science offices at OSPI provide guidance for the development and implementation of Washington learning standards and oversee assessments required by federal and state laws and regulations.

Learning Standards

The state's K-12 Science Learning Standards describe what students should know and be able to do at each grade band.

Assessments

Assessments are designed to help districts, schools, teachers, parents, and students determine the level of proficiency of a student's understanding of the science learning standards.

Mathematics and Science Partnerships

Federal funding for MSPs is provided through the No Child Left Behind Act. These partnerships improve the content knowledge of mathematics and/or science teachers in order to increase the achievement of their students.

Highlights

[Biology End of Course Supports Moodle](#)

[Biology EOC Item Specifications](#)
NEW

[Updates for 2012](#) **NEW**

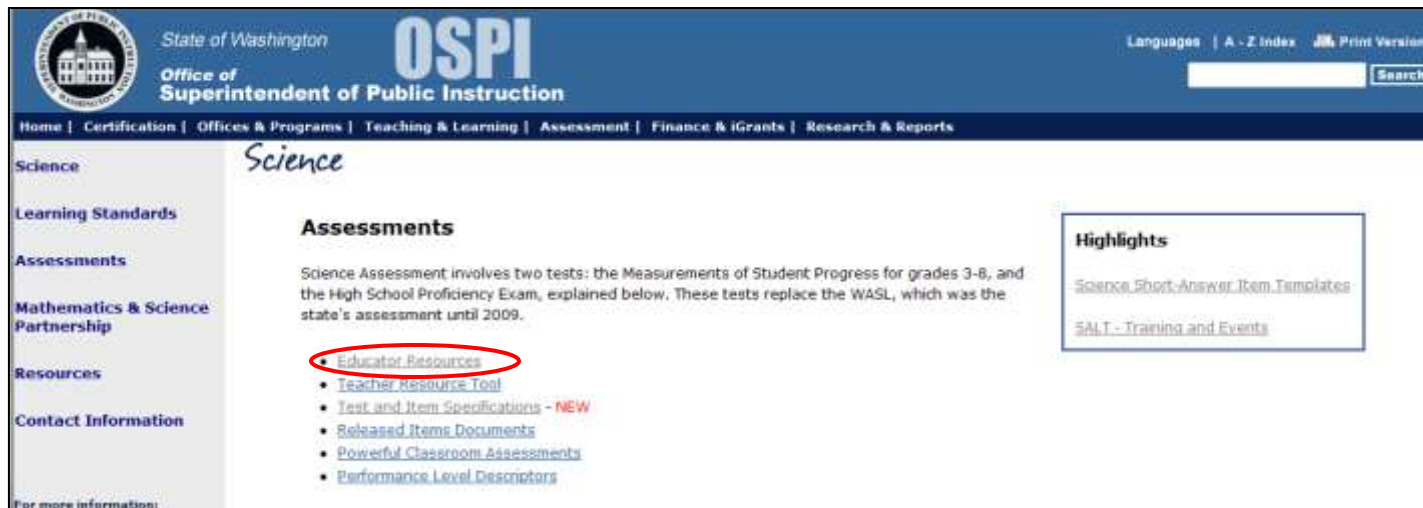
[End-of-Course Exams](#)

Life, Physical, Earth and Space Science

Systems
Quality
Application

SEATTLE
SUPERINTENDENT OF PUBLIC INSTRUCTION
WASHINGTON

Science Assessment



State of Washington
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Mathematics & Science Partnership

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For more information:

Assessments

Science Assessment involves two tests: the Measurements of Student Progress for grades 3-8, and the High School Proficiency Exam, explained below. These tests replace the WASL, which was the state's assessment until 2009.

- [Educator Resources](#)
- [Teacher Resource Tool](#)
- [Test and Item Specifications - NEW](#)
- [Released Items Documents](#)
- [Powerful Classroom Assessments](#)
- [Performance Level Descriptors](#)

Highlights

- [Science Short-Answer Item Templates](#)
- [SALT - Training and Events](#)



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Educator Resources

Science Assessment Update for 2012 NEW
These documents include: updates to the science assessment system for 2012; sample items to familiarize teachers and students with the item types on the assessments; and scoring information for educators.

- [Grade 5](#)
- [Grade 8](#)
- [Biology EOC](#)

• [Science Short-Answer Item Templates](#) UPDATED

• [Lessons Learned from Scoring Student Work](#) NEW
The Science Assessment Team shares observations about student responses for the Measurements of Student Progress and the end-of-course exam.



Updates

SCIENCE Assessment

Updates for 2012

Biology
End-of-Course (EOC)
Exam

Updates for 2012, Biology EOC

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Updates

SCIENCE Assessment

Updates for Biology End-of-Course Exam

Updates for 2012, Biology EOC

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Updates

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Updates

Biology End-of-Course Exam

Updates for 2012, Biology EOC

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Updates 2012 Biology EOC—Student

Directions: Answer questions 1 and 2 on pages 10 and 11. They are not connected to a scenario.

- 1 People sweat to help maintain body temperature. What type of feedback happens when sweating regulates body temperature?
- A. Positive feedback, because sweating can increase body temperature
 - B. Positive feedback, because sweating can decrease body temperature
 - C. Negative feedback, because sweating can decrease body temperature
 - D. Negative feedback, because sweating can increase body temperature



Test and Item Specifications



The screenshot shows the OSPI website for the State of Washington. The header includes the OSPI logo and the text 'State of Washington Office of Superintendent of Public Instruction'. A navigation bar lists various categories: Home, Certification, Offices & Programs, Teaching & Learning, Assessment, Finance & iGrants, and Research & Reports. The main content area is titled 'Science' and features a sub-section 'Test and Item Specifications'. It contains two main paragraphs: one about the Biology End-of-Course Exam in 2012 and another about the Grades 5 and 8 Science Measurements of Student Progress (MSP). A red circle highlights the link 'Biology Test and Item Specifications (PDF, 40 pages) (Word) - Updated with test map October 11, 2011' in the first paragraph. The second paragraph lists links for 'Grade 5 Test and Item Specifications' and 'Grade 8 Test and Item Specifications'.

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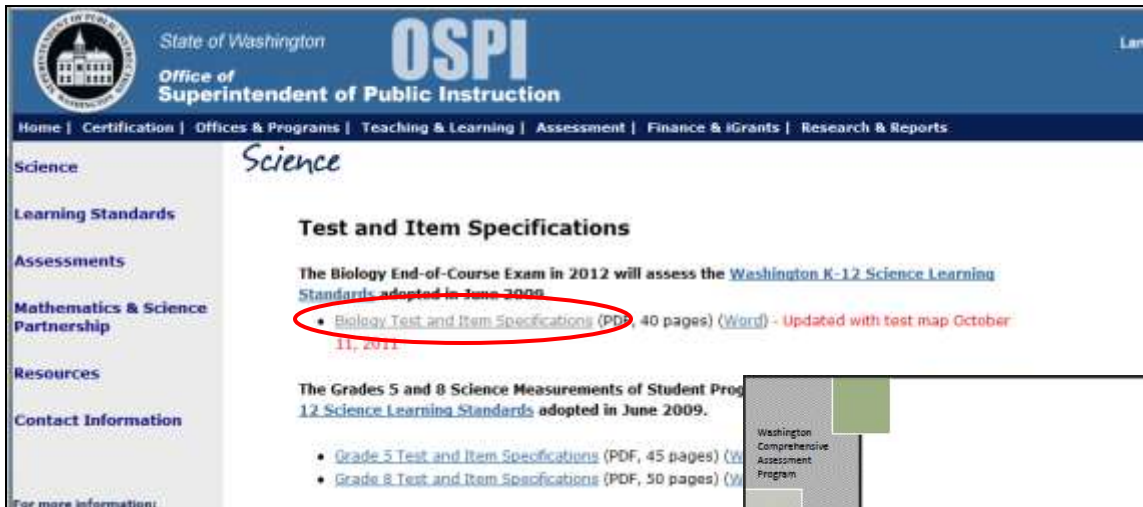
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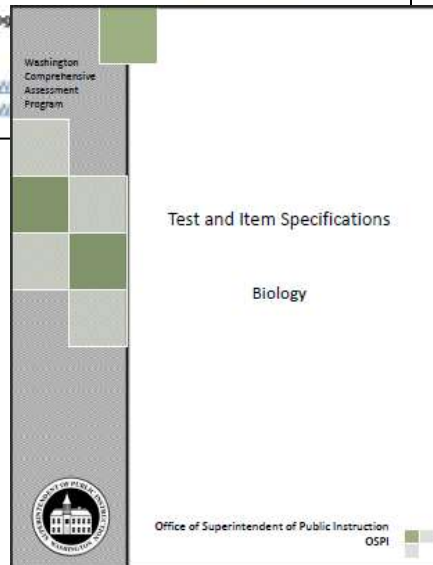
- [Grade 5 Test and Item Specifications](#) (PDF, 45 pages) (Word) - Revised July 22, 2011
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Test and Item Specifications



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The cover of the document is titled "Test and Item Specifications" and "Biology". It features a decorative border on the left side with a grid of squares in shades of green and grey. The Washington Comprehensive Assessment Program logo is visible in the top left corner, and the OSPI logo is in the bottom left corner. The text "Office of Superintendent of Public Instruction OSPI" is located at the bottom right.



Test and Item Specifications

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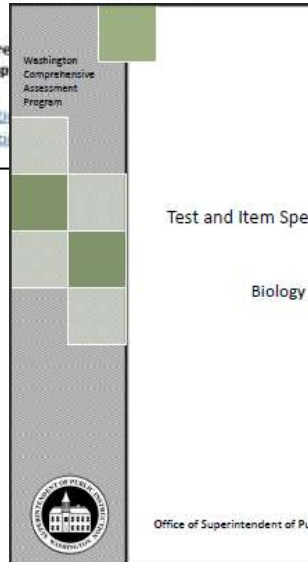
The Grades 5 and 8 Science Measure

12 Science Learning Standards adopted

- [Grade 5 Test and Item Specifications](#)
- [Grade 8 Test and Item Specifications](#)

Washington Comprehensive Assessment Program

Office of Superintendent of Public Instruction



Item Specifications: Biology

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Big Idea: Systems (SYS)
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Short Answer Templates



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Science

Science Short-Answer Item Templates

These Word documents contain templates for the question and the scoring rubric of common short-answer items on the Science MSP and Biology End-of-Course. The templates can be edited for use in classroom practice by incorporating content from any unit in a science curriculum.

Inquiry Items

Conclusion:	Grade 5	Grade 8	EOC
New Procedure:	Grade 5	Grade 8	EOC
New Field Study:	Grade 5	Grade 8	EOC

Application Items


Research & Explore:	N/A	Grade 8	EOC
Plan & Test:	Grade 5	Grade 8	N/A
Redesign:	Grade 5	Grade 8	EOC
Criteria & Constraints:	N/A	N/A	EOC
Test Solution:	N/A	N/A	EOC
Careers:	Grade 5	N/A	N/A

For more information:

Science Assessment
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Short Answer Templates



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Criteria & Constraints:	N/A	N/A	EOC
Test Solution:	N/A	N/A	EOC
Careers:	Grade 5	N/A	N/A

Biology New Field Study Item Template

0 Plan a field study to answer the question in the box. You may use any materials and equipment in your procedure.

Be sure your procedure includes:

- logical steps to do the field study
- conditions to be compared
- data to be collected
- method for collecting data
- how often measurements should be taken and recorded
- environmental conditions to be recorded

Field Study Question: *How does the independent variable affect the dependent variable?*

Procedure:



Lessons Learned from Scoring

2011 Lessons Learned from Scoring Student Work

Range-finding, scoring and data review of items on the Science Measurements of Student Progress (MSP) and the Biology End-of-Course (EOC) Exam provide the opportunity to see hundreds of student responses at each grade and/or course level and to evaluate data summarizing student performance. The Science Assessment Team would like to share observations about student responses and areas of science where students appear to be struggling. *Lessons Learned from Scoring Student Work* lists actions students could take to increase their scores on the state assessments. Because new standards are being assessed, we have also added descriptions of content that was particularly difficult for students. Grades and/or courses will be listed separately.

In general, students fail to earn points toward or vague responses that cannot be interpreted.

- answering the question or completing the response
- using bullets as a checklist to make sure all parts of the question are addressed

Biology

Short Answer questions

When answering short answer questions that have two bullets after an "in your description, be sure to" statement, students sometimes only answer the first bullet. These questions generally ask students to do the actions in **both** bullets twice as shown in the following example.

-Describe **two** ways to solve the problem.
In your description be sure to:
 - Identify **two** solutions to the problem
 - Describe how **each** solution will solve the problem

Students very often identify two solutions to the problem, but do not attempt the second bullet. They generally must at least attempt to address the second bullet to earn any points.

Conclusions

Students need to write more decisive conclusive statements. They should not write, "*the amount of water does have an effect on the plant height.*" Students should write a complete comparison, for example:

- *Plant A grew the tallest;*
- *Plant A grew taller than plant B and plant C;*
- *The more water the plant had, the taller the plant grew.*



OSPI Resources

- **Science Assessment**

- **Science Assessment Update for 2012**

- <http://www.k12.wa.us/Science/pubdocs/ScienceBioEOCUpdate2012.pdf>

- **Test and Item Specifications**

- <http://www.k12.wa.us/Science/TestSpecs/HSBiologyTestandItemSpec.pdf>

- **Short Answer Item Templates**

- <http://www.k12.wa.us/Science/ItemTemplates.aspx>

- **Lessons Learned from Scoring Student Work**

- <http://www.k12.wa.us/Science/pubdocs/2011LessonsLearned.pdf>

- **Science Teaching and Learning**

- **Webinar: Biology End-of-Course Update and Instructional Course Supports**

- <http://www.k12.wa.us/Science/Standards.aspx>

- **Life Science Instructional Supports Moodle:**

- <http://moodle.ospi.k12.wa.us/>



Upcoming Events:

- **Scenario and Item Writing Workshop**
 - February 7-10, 2012; grade 5 and Biology EOC
 - February 13-16, 2012; grade 8 and Biology EOC
- **Performance Level Descriptor Training**
 - February 1- April 27, 2012; Biology EOC
- **Contrasting Groups Study**
 - April 9-27, 2012; Biology EOC
- **Content Review**
 - April 9-13, 2012; Grades 5 & 8
 - April 16-20, 2012; Biology EOC
 - April 23-27, 2012; Biology EOC
- **"SALT" and "PEPPER" email list**
<http://www.k12.wa.us/Science/ProfDevelopment.aspx>



Next Generation Science Standards (NGSS)

- Based on Framework for K-12 Science Education
- Washington is a lead state partner
- Multiple rounds of review by lead states, and then all states, until autumn 2012
- February 2012—Public document expected
- Washington state efforts being lead by Ellen Ebert (ellen.ebert@k12.wa.us)
 - www.nextgenscience.org

Questions?

- Contact us:
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