

The left side of the slide features several vertical bars of varying shades of blue and white, and a cluster of five blue circles of different sizes arranged in a roughly circular pattern.

STUDY OF K-8 CURRICULUM REVIEW

Washington State Math Panel
Strategic Teaching
November 5, 2008

CHARGE TO STRATEGIC TEACHING

- Review OSPI's process for reviewing curriculum
 - Statistician: Dr. Sean Mulvenon
- Complete a content alignment in grades 2, 4, and 7 and compare OSPI and ST results
 - Four-member team
- Analysis of mathematical soundness
 - Mathematician: Dr. W. Stephen Wilson
- ** Summarize each program

- No program is a perfect fit: every program will need supplementation.
- Programs not at the top of OSPI (e.g., *Bridges*, *Investigations in Mathematics*, *Saxton Math*, *Singapore Math*) rank orderings can be the foundation of a successful math program
- The purpose is to identify programs closest to Washington's standards and most likely to prepare students to move forward with success in mathematics.

OSPI preliminary recommendations:

- Elementary School:
 - Math Connects (K-5)
 - Bridges (K-5)
- Middle School:
 - Math Connects (6-8)
 - Holt (6-8)

ST content alignment and mathematical analysis support:

- Elementary School
 - Math Connects (K-5)
 - Math Expressions (K-5)
- Middle School:
 - Math Connects (6-8)
 - Holt (6-8)
 - Prentice Hall (6-8)

OSPI METHODOLOGY

- Every program had an equal opportunity to be selected.
- OSPI displayed highest level of professionalism.
- OSPI applied widely-used protocols with unusually rigorous controls.
- Statistical analysis is sound and commonly used, although what ST would have used.

BEFORE LOOKING AT CONTENT ALIGNMENT:

- Different methodologies (page 10)
 - Goals
 - Approach to looking at program/Average time
 - Scored attributes
 - Number of reviews/Number of reviewers/Number of points on rubric
 - Non-matching scores
 - Grade-levels

BEFORE LOOKING AT CONTENT ALIGNMENT

- The scaled score may be different even when reviewers agree on the degree of the content alignment
- OSPI reviewed lessons in publisher's alignment; ST reviewed every lesson.
 - Chart on page 26
 - ST reviewer comments on page 19
- Different groups looked at the same material and made different judgments

ELEMENTARY SCHOOL CONTENT RESULTS

(PAGE 13 AND 14)*

Bridges Grade 2 Average Scale Score	0.86	0.65	-21%
Investigations Grade 2 Average Scale Score	0.61	0.63	-2%
Math Connects Grade 2 Average Scale Score	0.76	0.78	2%
Math Expressions Grade 2 Average Scale Score	0.69	0.80	11%
Bridges Grade 4 Average Scale Score	0.62	0.88	26%
Investigations Grade 4 Average Scale Score	0.50	0.50	0%
Math Connects Grade 4 Average Scale Score	0.76	0.76	0%
Math Expressions Grade 4 Average Scale Score	0.53	0.90	37%

*Apparent discrepancies in differences are due to rounding.

MIDDLE SCHOOL CONTENT RESULTS

(PAGE 14)*

Math Connects Grade 7 Average Scale Score	0.75	0.71	-4%
Holt Grade 7 Average Scale Score	0.85	0.89	4%
Math Thematics Grade 7 Average Scale Score	0.73	0.77	4%
Prentice Hall Grade 7 Average Scale Score	0.64	0.78	14%

Findings

- The content alignment results are close enough to verify OSPI's work.

MATHEMATICAL SOUNDNESS

- “Subtract little number from the big number”
- Analyzed development of five threads across grade levels
- One mathematician, W. Stephen Wilson, Ph.D., reviewed all of the programs for every thread
- ST should have included a second mathematician’s review
 - Ensure confidence
 - Ensure balance

ELEMENTARY SCHOOL MATHEMATICS ANALYSIS

Page 20	Whole Number Multiplication	Area of Triangle	Adding and Subtracting Fractions
Bridges	+ Well-done, but insufficient focus	— Area of a rectangle with formula done well, but weak development of areas of parallelogram and triangle. No word problems.	— A math error (now corrected) was present in one of the 3 sample problems for fractions. Fractions are shown to be numbers on the number line, but adding and subtracting fractions are not. Instead it is addition and subtraction of parts of things. Common denominators and word problems need development.
Investigations	√ Well-done in single supplemental lesson	√ Concept of area well done in main program; one-page supplement develops formulas for rectangles, parallelograms, and triangles, but height of triangle is not defined. No word problems.	√ Strong models (clock and rectangular grid) in grade 5 help overcome confusing work in grades 3 and 4. Work is limited to small numbers and common denominators are not well developed. No word problems.
Math Connects	+ Well done, but does not show place value and commutativity/ distributivity in one place	—Incomplete. Rectangle is well-done, but then the program stops.	+ Fractions and arithmetic of fractions well taught, although least common denominator is emphasized. Sufficient number of word problems.
Math Express	+Completely developed	+All necessary concepts and formulas thoroughly developed. Numerous and varied word problems.	+ Fractions, as well as addition and subtraction of fractions, are defined as numbers. Common denominators well taught. Numerous word problems.

MIDDLE SCHOOL CONTENT RESULTS

Page 27	Multiplication and Division of Fractions	Proportions
Holt	√ Multiplication of fractions is nicely modeled, but explanations for general rules for multiply and dividing fractions are missing. Contains lessons that come close and could easily be extended.	√ Content is present, but sometimes (i.e., cross products) conceptual understanding is not developed and often the connections among related topics like rates, proportions, slopes and linear equations are not explicit enough.
Math Connects	— Multiplication of fractions is nicely modeled, but explanations for general rules for multiply and dividing fractions are missing.	+ Thoroughly develops ratios, rates, and proportion including definitions. Proportion problems are numerous and of various types.
Math Thematics	— Multiplication of fractions is nicely modeled, but explanations for general rules for multiply and dividing fractions are missing.	— The content is present, but definitions and explanations about the logic of why something work are often presented a year after a topic is taught. Connections between related topics (e.g., linear equations and graphs that are lines) are often missing.
Prentice Hall	√ Multiplication of fractions is nicely modeled, but explanations for general rules for multiply and dividing fractions are missing. Contains lessons that come close and could easily be extended.	√ Definitions for ratios, rates, and proportions are included and correct. Cross products are explained the second year they are taught. Slope is not completely developed and connected to equations and graphs. Proportions are not connection to graphs.

ST FINDINGS

- The content alignment results are close enough to verify OSPI's work.
- Mathematical analysis supports slightly different choices than OSPI

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PROGRAM CHARACTERISTICS

(PAGE 35 - 43)

- Summarizes results of content alignment review and mathematical analysis
- Includes other global information, such as pedagogical preferences shown in various programs