



Cindy Bryant

Mathematics Consultant

Missouri Department of Elementary and Secondary
Education

Cindy.Bryant@dese.mo.gov

573.751.1395

Math End-of-Course Exams Implementation Schedule

2008 – 2009

- Algebra I

2009 – 2010

- Algebra II, Geometry, Integrated Math II, Integrated Math III

Aligned to v2.0 GLEs

MAP Exams Implementation Schedule

2008 – 2009

- Grades 3 – 8 Math Aligned to the **March, 2004 GLEs**

2009 – 2010

- Grades 3 – 8 Math Aligned to the **v2.0 GLEs**

Assessment Item Development

Scoring

Achievement
Level Setting

Operational

Field Test
Pilot & SRR

Content/Bias
Review

Item Writing

Data and Accountability Questions...

Margie Vandeven, Director Accountability
Data

Margie.Vandeven@dese.mo.gov

Janet Duncan, Assist. Director Accountability
Data

Janet.Duncan@dese.mo.gov

DESE/METS K – 12 Learning Goals



Content Priorities

A few mathematical ideas (core content) for a grade level or course that serve as an organizing structure for curriculum design, instruction, and assessment.

www.missourimets.com

DESE/METS K – 12 Mathematics Learning Goals

Learning Goals	Grade/Course-Level Expectations
<ul style="list-style-type: none">• CURRICULUM framework• Identifies <u>content priorities</u> and <u>assessment specifications</u> for a mathematics course or grade	<ul style="list-style-type: none">• ASSESSMENT framework• Identifies only <u>assessment specifications</u> for a mathematics course or grade

DESE/METS K – 12 Mathematics Learning Goals

Classroom Implications:

Less = **MORE**



Focus



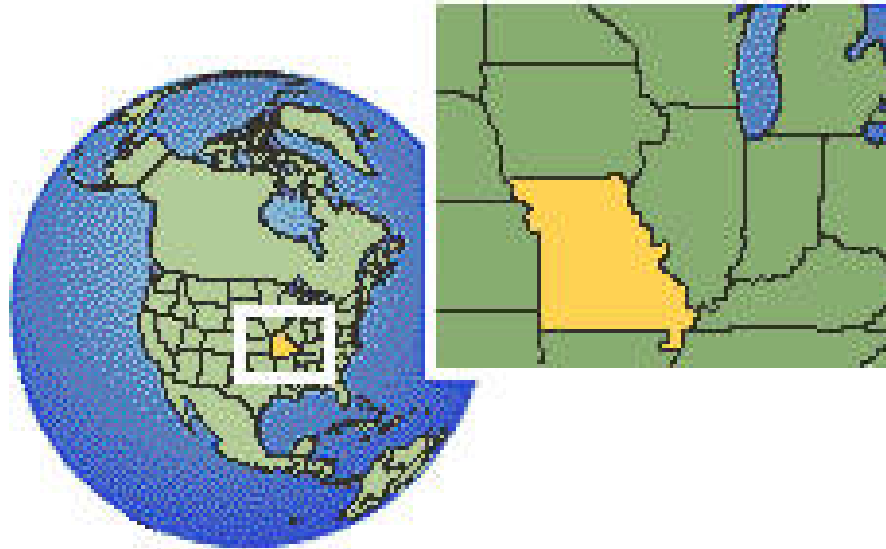
Time

DESE/METS K – 12 Mathematics Learning Goals

Classroom Implications:

- Does not include references to textbooks or teaching methods.
- More specific *Performance Indicators* include important processes outlined in the Show-Me Standards.

Looking beyond the GLEs and CLEs...



Curriculum work and textbook
decisions???

Algebra I—Core Content

Content	Problem Solving/ Reasoning/Communication/ Connections/Representations
Linear and Nonlinear Relationships (15%)	<ul style="list-style-type: none">•Create, apply, and adapt a variety of strategies to solve problems.•Make and investigate mathematical conjectures.•Develop and evaluate mathematical arguments and proofs.•Use the language of mathematics to express mathematical ideas precisely.•Understand how mathematical ideas interconnect.•Create and use representations to organize, record, and communicate mathematical ideas.•Select, apply, and translate among mathematical representations to solve problems and model situations.
Linear Expressions, Equations, Inequalities and Functions (30%)	
Non-Linear Functions (30%)	
Trend Lines and Correlation (10%)	

Missouri is a “**local control**” state in regards to textbook adoption. Therefore, it is against DESE policy to recommend a particular textbook series or publisher.

Textbooks

- Because **MOST** textbooks are designed with an eye to sales in as many districts as possible, they include content specified by the guidelines from a number of different states. They usually contain much more material than a teacher can cover fully in a year, especially in mathematics and science.
- Often, states and school districts are bombarded with information from textbook publishers claiming that their materials are aligned with benchmarks and standards.

Content Analysis

Substance and sophistication...

Instructional Analysis

Focus only on textbook activities and lessons that are aligned with the content learning goals, and to examine specific guidance provided to help students learn that content.

Building on student ideas about mathematics...

How well does the material:

- Specify prerequisite knowledge?
- Alert teachers to commonly held student ideas?
- Assist teachers in identifying student ideas?
- Address misconceptions?

Engaging students in mathematics....

How well does the material:

- provide a variety of phenomena or mathematical context and make it vivid to students, particularly through an appropriate number of firsthand experiences?

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Developing mathematical ideas...

How well does the material:

- Justify ideas?
- Introduce terms and procedures?
- Represent ideas and/or connect ideas?
- Demonstrate/model procedures and applications of knowledge?
- Provide practice opportunities?

Promoting student thinking about mathematics...

How much material:

- Encourages students to explain their reasoning?
- Guides them in the interpretation and reasoning?
- Encourages students to think about what they've learned?

Assessing student progress in mathematics...

How well do the assessments:

- Align with the learning goals addressed in the material?
- Assess students' ability to apply them?
- Use assessment to inform instruction?

Enhancing the mathematics learning environment...

Does the material:

- Provide teacher content support?
- Establish a challenging classroom?
- Support all students?

Grade 4 Curriculum Focal Points	Number and Operations: Developing quick recall of multiplication facts and related division facts and fluency with whole number multiplication	Number and Operations: Developing an understanding of decimals, including the connections between fractions and decimals	Measurement: Develop an understanding of area and determining the area of two-dimensional shapes	Connections to the Focal Points ...
Grade 4 DESE/METS Mathematics Learning Goals Core Content	Core Content A: Multiplication and Division: Basic Facts Fluency and Multi-Digit Computation (30 %)	Core Content B: Decimal Place Value and Connections to Fractions and Percents (30%)	Core Content C: Area Measurement and Transformations (15%)	Core Content D: Data Organization and Analysis (10%)
Content Analysis (Scale→)	■ Most content ■ Partial Content ■ Minimal Content □ Not present			
Addresses specific substance of the learning goal; aligns to student developmental needs; reflects the level of sophistication of the learning goals	■	■	□	■

Instructional Categories Analysis (Scale→)	● High potential for learning to take place ● Some potential for learning ● Little potential for learning to take place ○ Not present			
Identifying a sense of purpose	●	●	○	●
Building on student ideas about mathematics	●	●	○	●
Engaging students in mathematics	●	●	○	●
Developing mathematical ideas	●	●	○	●
Promoting student thinking about mathematics	●	●	○	●
Assessing student progress in mathematics	●	●	○	●
Enhancing the mathematics learning environment	●	●	○	●

Source: Project 2061 funded by NSF

Guiding Questions for Selecting a Mathematics Textbook

In assessing a textbook, educators should consider the following:

- What key mathematical ideas in each content strand should each grade level or course address?
- How does the content of the textbook align with these key mathematical ideas?
- What types of activities does the textbook provide? Do they foster mathematical thinking or do they simply show how to do a procedure?

Guiding Questions for Selecting a Mathematics Textbook

In assessing a textbook, educators should consider the following:

- Are there a variety of instructional activities that allow for differentiation?
- Do the activities engage the students?
- Is there a focus on problem solving? Are students expected to explain “why”?
- Are students asked to explore “what if” questions and to offer and test conjectures.

Guiding Questions for Selecting a Mathematics Textbook

Professional Development

Research has shown that the process of **investigating** and **implementing** curriculum can **enhance a teacher's knowledge of the subject matter** and improve instruction.

Therefore, professional development should accompany the adoption of a new textbook so that teachers understand the textbook's goals and strategies.

Guiding Questions for Selecting a Mathematics Textbook

Professional Development

- Is there an initial introduction to the materials?
- Are there regular opportunities for teachers and administrators to meet and discuss accomplishments and challenges?
- Is there ample time and opportunities for teachers to collaborate on previewing upcoming units?
- Is there follow-up training to provide opportunities for teachers to interact with experienced users of the curriculum.

**Constructed-Response
and Performance Event
Assessment Scoring
Clarifications...**

Rules for Patterns

- **When students are asked to find a rule (for a pattern),** they should provide a general statement, written in numbers and variables or words, that describes how to determine **any term** in the pattern.
- Rules (or generalizations) for patterns can be written in either **recursive** or **explicit notation**.

Describing or Explaining a pattern...

should include the beginning term and the procedure for finding any subsequent term.

Describing or explaining how to find the next term in a pattern...

Example: add 5

Example: multiply by 7

Example: multiply 6 times 3 and add 1

Symbolic Representations

Expressions...

can be written using numbers, operation symbols and variables.

Example: $4a$

Example: $3 + 6x$

Equations...

can be written using an **equal sign**, numbers, operation symbols, and variables.

Example: $6x - 5 = 2x - 1$

Example: $x = 2^3 + 7$

Equalities

A number sentence is an equality, so a vertical or horizontal run on number sentence or string of numbers such as $3 + 5 = 8 \times 5 = 40$

or

$$\begin{array}{r} 3 \\ +5 \\ \hline 8 \\ \times 5 \\ \hline 40 \end{array}$$

Example: $(8 \times 7) + 6 = 62$

Example: $4 + 3 = 7$

$$\begin{array}{r} \times 5 \\ 35 \times 4 = 140 \end{array}$$

are not equalities, therefore they are **not acceptable representations** for a **number sentence** or an **equation** or for **showing process**.

Graphs

If no scales are included on a graph:

- a. Students can assign any scale they wish
- b. It is assumed the scale is 1

A broken axis, with other intervals consistent, means the intervals between zero and

- a. the first increment are compressed
- b. one are compressed

25th Anniversary of the Presidential Award for Excellence in Mathematics and Science Teaching

Each year, since 1983, the President of the United States recognizes outstanding kindergarten–6th grade or 7th–12th-grade mathematics and science teachers by bestowing upon them the Presidential Award for Excellence in Mathematics and Science Teaching (PAEMST). The 2009 PAEMST program will honor 7th – 12th grade mathematics with a \$10,000 award and recognition ceremonies in Washington, DC. To nominate yourself or someone else visit www.paemst.org by April 1, 2009.

Questions???

