

Executive Summary:

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*Update on Year One of the
Mathematics Curriculum Review
Lexington Public Schools
June 12, 2007*



“The Process”

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- The Committee
- Meetings
- Goals for Year One
- Study Groups
 1. Review of Current Mathematics Literature/Research
 2. Analysis of Lexington Student Performance and Local Data
 3. Review of Local K-12 Curriculum Alignment & Implementation



Research & Literature

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The learning of Mathematics has changed considerably for today's students compared to those of a generation ago.

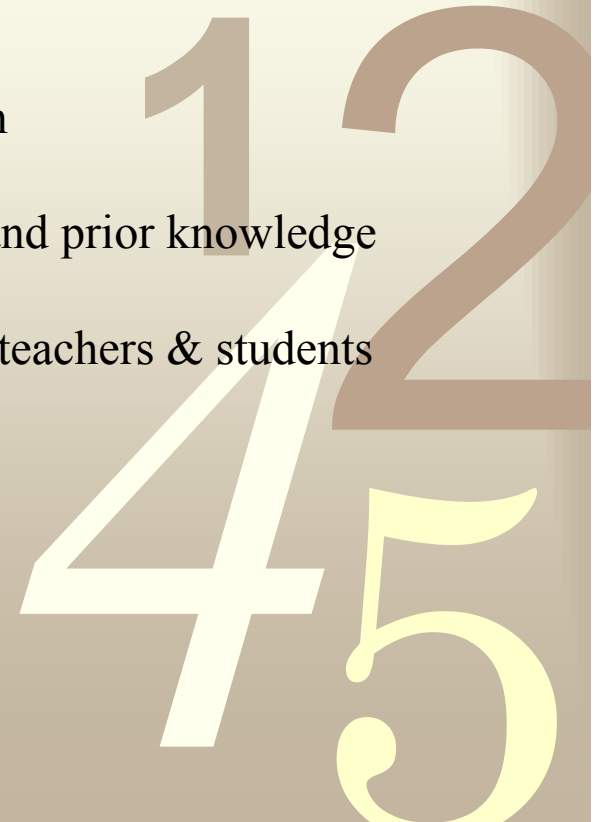
- NCTM – 1989
 - 6 principles
 - 5 content standards
 - 5 process standards
- Massachusetts Curriculum Frameworks- 1992



NCTM Principles

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- **Equity**
 - High Expectations and Strong Support for ALL students
- **Curriculum**
 - Coherent & Well-Articulated Across the Grades
- **Teaching**
 - Understanding what students know and need to learn
- **Learning**
 - Students building new knowledge from experience and prior knowledge
- **Assessment**
 - Supports learning and furnishes information to both teachers & students
- **Technology**
 - Essential piece influencing teaching & learning



NCTM Standards

• CONTENT

- Numbers & Operations
- Algebra
- Geometry
- Measurement
- Data Analysis & Probability

• PROCESS

- Problem Solving
- Reasoning & Proof
- Communications
- Connections
- Representation

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Statement of Purpose

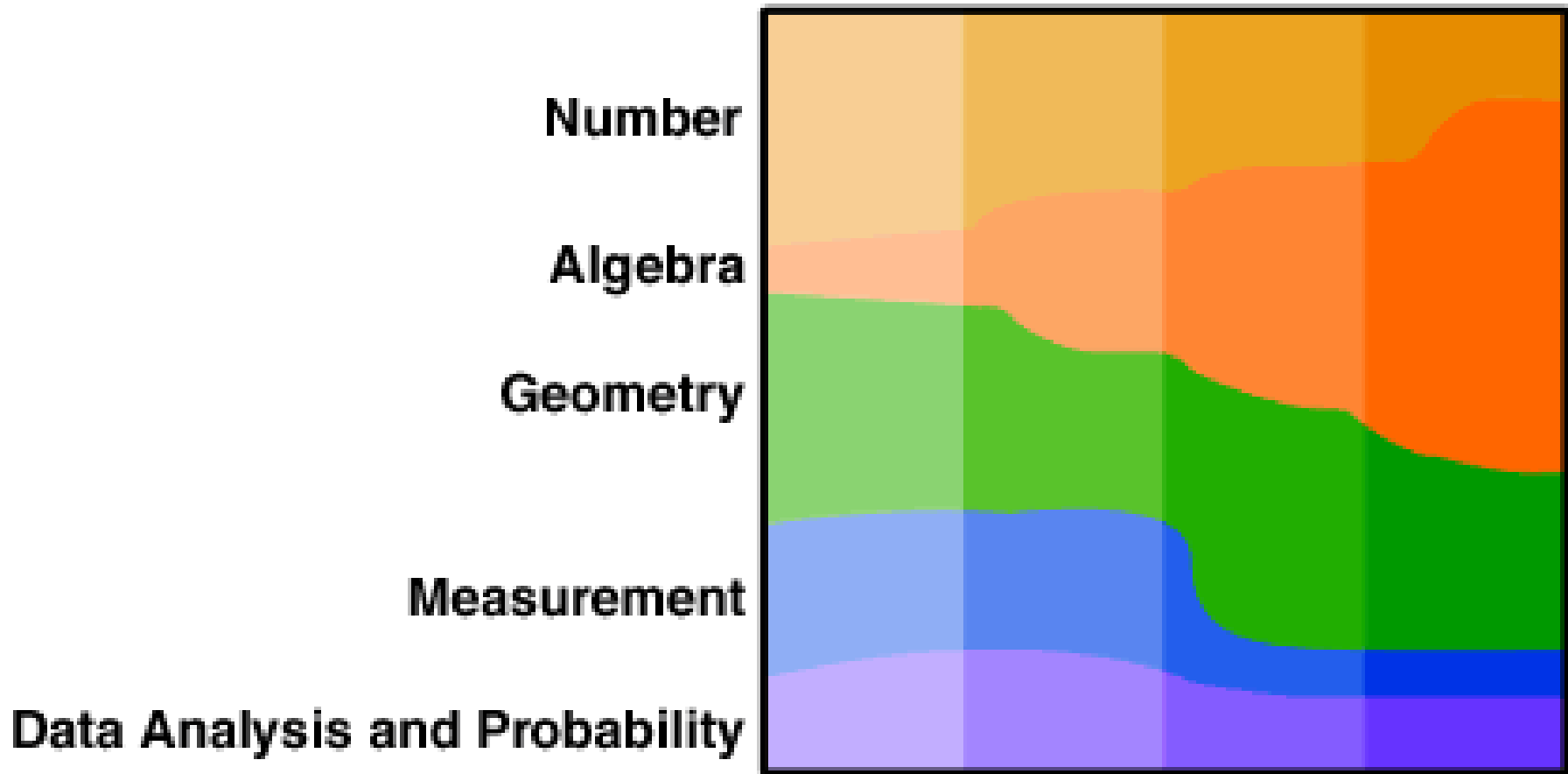
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- Philosophical Framework
 - Essential Mathematics' Learning
 - Understanding and Depth
 - High Quality Standards
 - Achievement & Success for All
 - Varied Learning Styles
 - Lifelong Applications: the “power and beauty of mathematics in our daily lives”



A Comprehensive Math Program

Pre-K-2 3-5 6-8 9-12

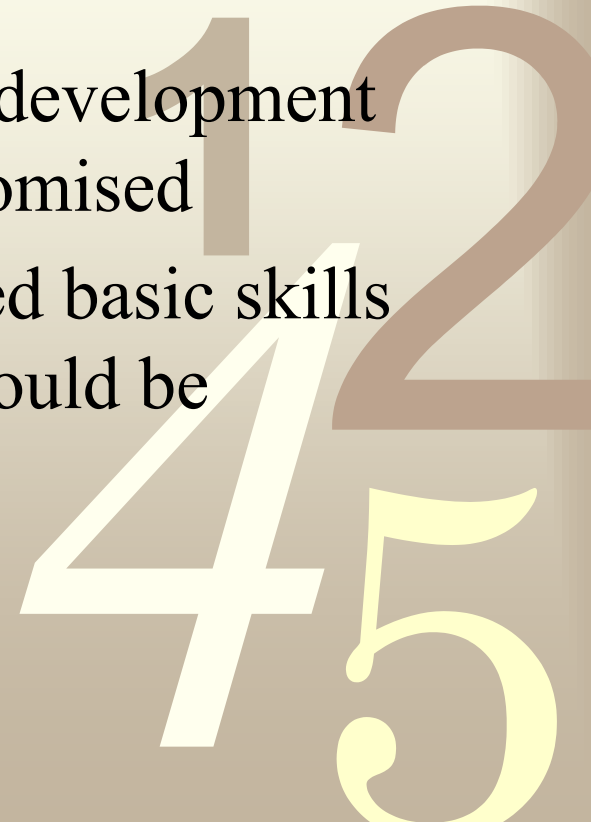


“The Math Wars”

The Controversy

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- The vision prompted by the NCTM has influenced widespread changes in mathematics education
- Some parts have been controversial
- Some critics feel that the traditional development of calculation skills has been compromised
- NCTM insists it has always supported basic skills development, but that these skills should be developed with understanding



Mathematics Research Council (2001):

“Adding It Up: Helping Children Learn Mathematics”

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There are 5 elements essential to proficiency:

- Conceptual Understanding
- Procedural Fluency
- Strategic Competence
- Adaptive reasoning
- Productive Disposition

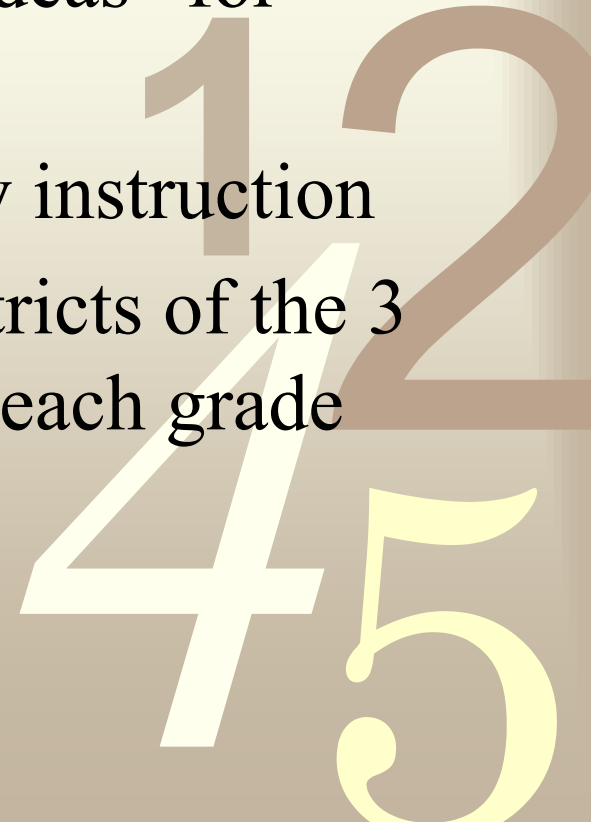


Mathematics Curricular Focal Points, PreK-8 (2006):

“A Quest for Coherence”

- An effort to standardize the “big ideas” for specific grade levels
- Not specific enough to guide daily instruction
- An outline for states and local districts of the 3 most significant math concepts at each grade level

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Mathematics textbooks

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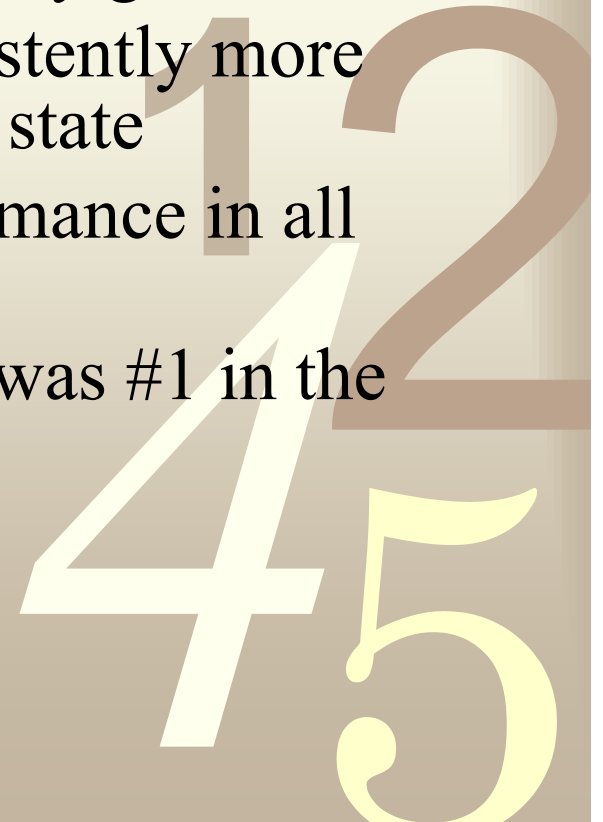
- Wide variety of opinions, but relatively few rigorous studies of the question
- The federal, *What Works Clearinghouse* reviewed 4 textbook series that form about 50% of the elementary textbook market found that only one series, *Everyday Mathematics* (EDM) had researched based evidence of positive effects on student learning

(Education Week 1/24/07)

Areas of Strength (K-5)

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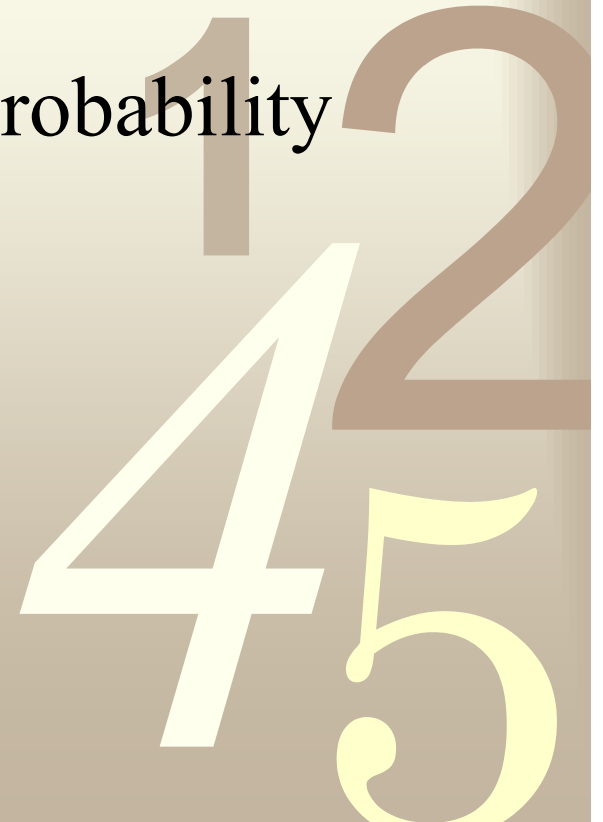
- Overall alignment with the State Frameworks
- Some difference of opinion at K-2 about the developmental appropriateness of some of the state benchmarks; these are resolved by grade 3
- Expectations of the district are consistently more ambitious than those outlined by the state
- MCAS results indicate strong performance in all grades tested
- Lexington's Grade 5 MCAS (2006) was #1 in the State



Areas of Strength (6-8)

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- Full alignment with the Frameworks in:
 - Number Sense & Operations
 - Data Analysis, Statistics, & Probability
 - Measurement
 - Geometry



Areas of Strength (9-12)

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- Core curriculum is aligned with the Frameworks at grades 9-10 for all but one learning standard (vertex edge graphs)
- 77% of LHS students achieved at the *Advanced* Level; 11% at the *Proficient* Level (MCAS 2006)
- Core curriculum (11-12) is aligned with the Frameworks for all but two learning standards (use of vectors to solve problems; survey designs and random sampling techniques to avoid bias in data collection)

Areas of Strength (9-12)

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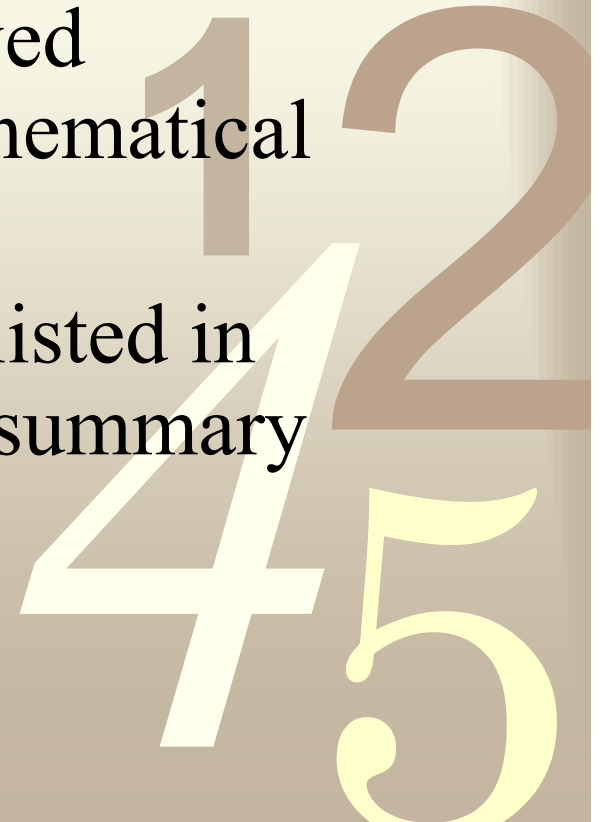
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- Core topics are spiraled throughout the 4 year program so as to develop mastery by the end of HS
- Substantive 4 year college prep sequence enables students to continue academic studies in mathematics, science, and/or mathematics related fields
- Department strives for consistent coverage of core topics across **all** sections of the same course
- 95% commonality across sections in final exams

Other Notable Information

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- Our Middle School and High School Math Teams have done extraordinarily well in regional, state, and national competitions
- Individuals students have received exceptional recognition for mathematical successes
- The details of these awards are listed in Appendix #4 of your executive summary



Areas in Need of Improvement

K-12

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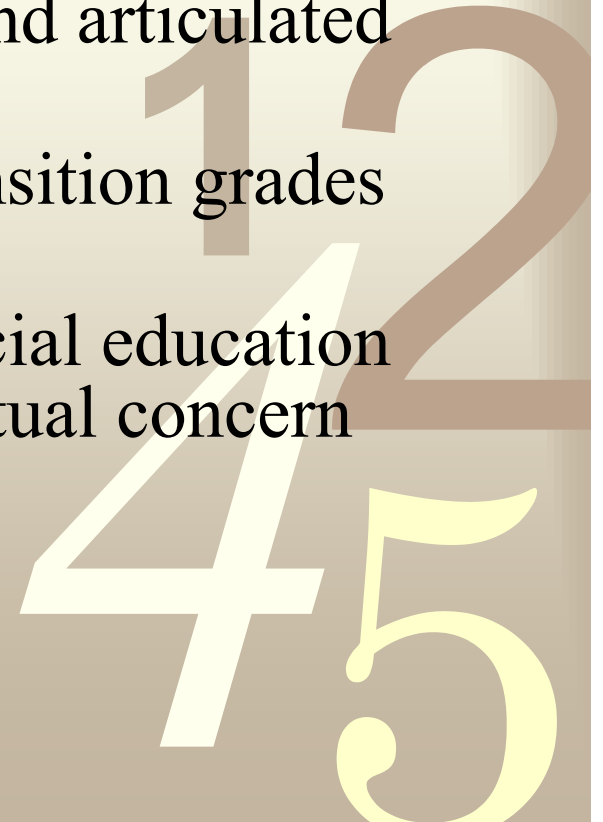
- Adjustment of identified misalignments
- Formal presentation of a clearly articulated and comprehensive K-12 mathematics Program
- Increased integration of mathematical topics as secondary students often experience a “disconnect” across the various branches due to an “artificial” separation of subject-specific courses
- Meeting Adequate Yearly Progress (AYP) for all sub-groups

Areas in Need of Improvement K-12

continued

- Clearer definition of time to be allotted to mathematics instruction (K-5)
- Increased opportunities for sharing: cross-grade; same-grade; cross-school to promote overall understanding of a comprehensive and articulated program
- Regular meetings for teachers at transition grades (5-6; 8-9)
- Increased regular education and special education collaboration to address areas of mutual concern in mathematics instruction

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Areas in Need of Improvement K-12

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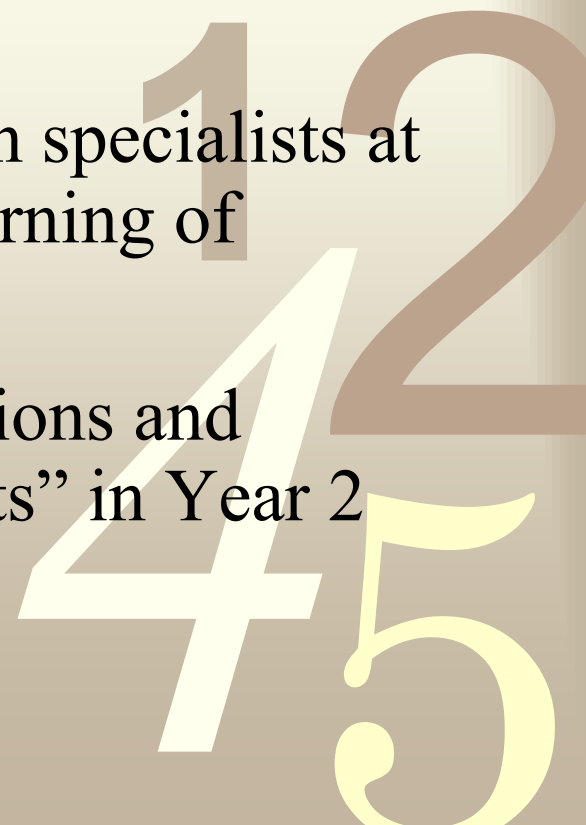
- Increased Professional Development and Teacher Training to address:
 - Varied learning needs for struggling and high performing students
 - More training regarding specific curricular & instructional accommodations for ELL, 504, IEPs, and other identified sub groups
 - Expanded opportunities for teachers (regular & special education) to deepen their understanding and competency in mathematics content

“Next Steps”

Years 2 and 3

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- Creation of a clearly articulated and comprehensive K-12 document
 - K-5 (summer of 2007)
 - 6-12 (fall 2007 – spring 2008)
- Hiring of 2 Mathematics Intervention specialists at the middle schools to support the learning of “at risk” students
- Review of various textbook publications and material resources for possible “pilots” in Year 2

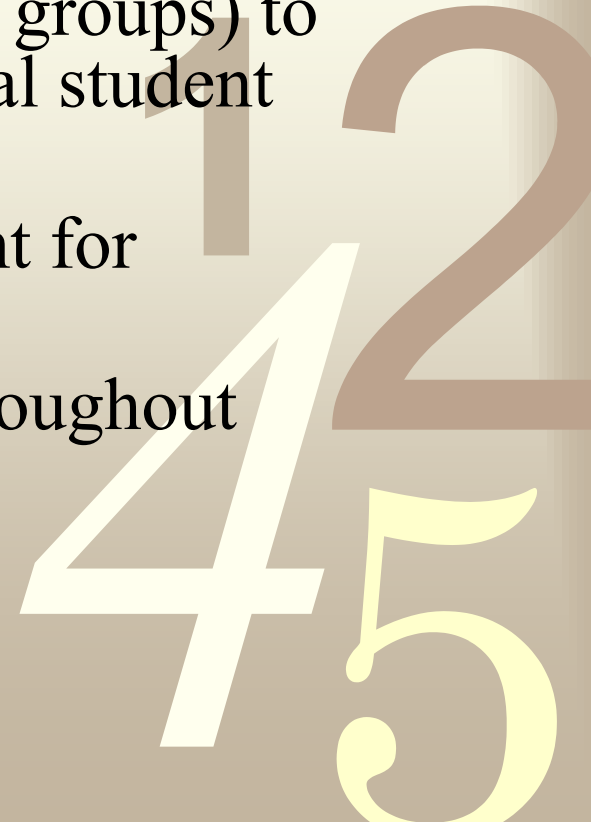


“Next Steps”

continued

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- Increased departmental meeting opportunities to address the need for more sharing, collaboration, and training
- Formation of sub-committees (study groups) to explore the particular needs of special student populations
- Recommendation of “time” allotment for mathematics instruction at K-5
- All other items will be addressed throughout Years 2 & 3



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QUESTIONS????

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