



Lexington Public Schools

146 Maple Street ❖ Lexington, Massachusetts 02420

Carol A. Pilarski
Assistant Superintendent for Curriculum, Instruction,
and Professional Development

(781) 861-2558
email: cpilarski@sch.ci.lexington.ma.us
fax: (781) 863-5829

To: Dr. Paul Ash
Members of the Lexington School Committee

From: Carol A. Pilarski

Re: **Summary:**
Update/Status Report on the Mathematics Curriculum Review

Date: June 8, 2010

I. **Introduction**

In June of 2009, I presented an end-of-year report summarizing the work of Years 1, 2, and 3 of the Mathematics Curriculum review process. The Mathematics Curriculum Review Committee had completed the 3rd and ‘final’ year of its work; however, while last year was “technically” the concluding year of the three-year process and the essence of the committee’s work was close to complete, I had reported that some projects and details remained outstanding and were scheduled to be addressed during the summer months of 2009 and in the fall semester of the 2009-2010 academic year.

Those projects did, in fact, occur over the course of the past year and decisions were made around certain curricular matters that had remained unresolved at that time. The purpose of this report is to update you on the current status. Several summer workshops were scheduled in July and August with additional meeting times set aside in the fall to finalize curriculum documents and some decisions regarding the district’s Mathematics program. I will elaborate further on the details of these workshops and subsequent meetings in the ensuing sections of this report.

It is important to note that while the central goal of any curriculum review is to complete the majority of the identified objectives over the course of the three-year cycle dedicated to this effort, *Curriculum, Instruction, and Assessment* should represent a continuous cycle of on-going and ever-evolving scrutiny. To this end, and most significantly, the curriculum review process has served to enhance the efforts of the district in formulating and furthering the work of Professional Learning Communities (PLCs). It has served to bring every school and teacher together to look at the inherent value of collaboration, informative assessment, and data driven decision-making in looking at student performance in meeting the standards. In addition to the PLC initiative, the creation of the Achievement Gap Task Force and the resultant *Action Plan for Equity and Excellence* has emphatically raised the focus on instructional interventions designed to appropriately and effectively advance the performance levels of students of color, of English Language Learners, and struggling students. These district-wide efforts coupled with each curriculum review process have served to augment our mutually beneficial goals and outcomes and have demonstrated the importance of collaboration and acknowledged interdependence.

II. Philosophical Framework

Before discussing the details of this past year's work, I feel compelled to re-state the guiding principles represented in the Mission Statement that was developed in Year 1. The principles contained in this mission consistently provide the backdrop and cornerstone for the district's Mathematics program:

The goal of the Lexington Public Schools mathematics program is to offer to all students a rich and engaging mathematics curriculum that focuses on important and essential mathematics, learned with understanding and depth. The program's aim is to enable every student to achieve full potential as a mathematics learner, based on a conviction that everyone can succeed when challenged by high expectations and offered strong support. The program takes a balanced approach to developing proficient skills, conceptual understanding, and mathematical habits of mind. Students are given opportunities to explore and discover mathematical ideas, to build their mathematical knowledge, and to cultivate their thinking, creativity, reasoning, and problem solving capabilities. Teachers seek to create learning experiences that are developmentally appropriate; to address varied learning styles, and use a variety of mathematical approaches and representations. Students are encouraged to communicate their mathematical ideas, to become confident and perseverant in using mathematics, and to appreciate the power, relevance, and beauty of mathematics.

Our collective commitment to these convictions is pivotal to the success of our Mathematics program as we strive to assure mathematical success and engagement for ALL students.

III. The On-Going Challenge:

The focus of our continued work rests in finding the balance and sometimes the necessary imbalance in offering a program that successfully combines both Content Standards (skills/benchmarks) AND Process Standards that emphasize thinking, questioning, experimenting, inventing, and visualizing. Mathematics instruction cannot be effective if it is based on either extreme . . . content or process. "Students become more proficient when they understand the underlying concepts of math and they understand the concepts more easily if they are skilled at computational procedures" (National Research Council – 2002 – *Helping Children Learn Mathematics*). I thought it would be important to give you a "taste" of our many discussions, by asking that you ponder an excerpt from an NSF (National Science Foundation) paper published by the Educational Development Center, Inc. (EDC) and authored by Al Cuoco, E. Paul Goldenberg, and June Mark (<http://main.edc.org>). It is exactly this kind of thinking that our mathematics teachers pay a great deal of attention to while grappling with decisions around the kind of mathematics program we need to offer Lexington's students.

Students entering Kindergarten in 2010 will graduate from high school in 2023. Educators can only guess at the problems that those graduates will face and the corresponding mathematical competencies that they will need. Still, educators must define and implement a K-12 mathematics curriculum in 2010 that will prepare students for the uncertain demands of 2023.

Mathematics curriculum standards documents – whether prepared by states, districts, or the publishers of instructional materials – often focus upon, or are limited to, consideration of what students are to learn. Some are grade specific; others are course specific. Some go so far as to address expectations for specific student groups or programs of study. Despite these varied efforts, the resulting (current) K-12 curriculum has been characterized as being "eight years of 11th century arithmetic followed by two years of 16th century algebra and a year of 3rd Century BCE geometry." At the

secondary school level, students perceive it as a smorgasbord of facts and procedures to be acquired one-by-one, applied to “types” of problems, and demonstrated successfully on a variety of tests (end-of-unit, end-of-course, statewide proficiency, scholarship, and college entrance/placement). Upon graduation, those students often find that they don’t have access to the mathematics that they need.

The fundamental difference in the instructional emphases outlined above is most simply represented by these two questions:

- Should instructional emphasis in mathematics courses be on developing “**mathematical apprentices**” who are prepared to use specific mathematical formulas and techniques?
- OR**
- Should instructional emphasis in mathematics courses be on developing “**mathematical practitioners**” who are able to select and apply a wide array of mathematical tools in order to solve unfamiliar problems?

What Lexington’s Mathematics program is striving to do is to find the appropriate balance that will assist students in creating those mathematical “habits of mind” that will allow them to think, apply, and discover the mathematics they need to know and use in real life applications.

“Organizing the mathematics curriculum around *Habits of Mind* gives students the tools they will need to use, understand, and even ‘make’ mathematics that doesn’t yet exist. Such a curriculum lets students “in” on the process of creating, inventing, conjecturing, and experimenting. It is a curriculum that encourages false starts, calculations, experiments, and special cases. A *Habits of Mind* curriculum is devoted to giving students a genuine research experience and values how a particular piece of mathematics typifies an important research technique as much as it values the importance of the result itself.” (*Developing Mathematical Habits of Mind* – Contemporary Curriculum Issues by June Mark, Al Cuoco, E. Paul Goldenberg, and Sarah Sword) (Appendix A)

IV. Mathematics Curriculum Review . . . the on-going process

- Implementation of newly articulated curriculum.
- Collection of data using benchmark outcomes/assessments around the curriculum.
- Sharing and discussion of data based on outcomes.
- Determination of student academic growth using data analysis.
- Based on data analysis results, making projections for any necessary updates and additional supports
- Identification of professional development needs so as to ensure effective implementation of curriculum and accompanying instructional strategies.

District-Wide Update and Sustained Focus:
--

- Upload all curriculum documents, including all available resources, and assessments onto the newly adopted web-based program, *Atlas Rubicon*. This program is designed to provide a coherent way to represent a district’s horizontal and vertical curriculum alignment and promises to be an invaluable tool for us as we move forward in placing all of our curriculum “on-line” for teachers to access. The program also allows teachers to be able to share implementation strategies and activities across grade levels. Certain “privileges” and access to this site will also be made available to parents, once the work of uploading and refining the information is complete. Continuing training is planned for this summer in the use of this program. (A snapshot presentation of this program will be demonstrated at Tuesday evening’s LSC meeting.)

- Continue to work towards improving the quality of instruction to meet the learning needs of ALL students, including those who require specific curricular and/or instructional accommodations at all grade levels in all courses through programs like Response to Intervention (RTI), other tiered models of intervention, targeted PLC work, and more collaborative work with the Special Education department.
- Continue to work on addressing the needs of our ELL students, special education students, students on the autism spectrum, and those who are disenfranchised.
- Provide regular opportunities/meeting times for K-12 departmental members to sustain conversations about the effectiveness of the program at both horizontal and vertical levels.
- Provide professional development to learn new content, pedagogy, assessment practices, technology integration, and ways of implementing curriculum and pedagogy.
- Increase communication with and education of parents with regard to the district's mathematics program in more regular and consistent ways in order to promote a clearer understanding of the curriculum, course recommendations, and other related instructional information.

V. Accomplishments

Elementary K-5:

- Curriculum:
 - Completion of a K-5 Curriculum Document aligning the Massachusetts State Frameworks with the Lexington's standards; identification of the units of study in the Everyday Mathematics Program that correlate to the benchmarks and the essential vocabulary/concepts that support these standards.
 - Implementation of a clearly identified Kindergarten Scope and Sequence for the district's full-day kindergarten program.
 - Purchase of ancillary materials to support learning; purchase of commercial math games for each school to be used in classrooms to extend and enrich the program.
 - Update of locally-developed End-of-Year Summative Assessments administered for the first time in June of 2009 to ensure and evaluate essential learning. The resulting student data was collated and analyzed over the summer months to inform targeted student instruction in the opening weeks of school. The summative data will be used to track student growth over time, provide exit data, to assess the effectiveness of instruction and/or intervention, and provide the teacher with a snapshot of his/her students before they move on to the next grade. Receiving teachers report that they have found the information helpful to have at the beginning of the year.
 - Completion and Implementation of the district's "homegrown" Differentiation Guides for teachers at each grade level offering extensive ideas and tools for extending and enhancing instruction to meet the needs of diverse learners.
 - Incorporation of flexible grouping practices.
 - Assessing Math Concepts (AMC) training for Grades K, 1, 2, and special education. This is an assessment tool that assists teachers in evaluating the skill status of students at various grade levels.
 - Program planning for METCO Extended Learning Program (MELP).
 - Collaboration with EDCO in newly established summer program: MATHpath for our Boston resident students.
 - Use of Everyday Mathematics Games software as a pilot.
 - Implementation of *FASTT Math* software by each 3rd grade classroom to increase students' automaticity skills in basic arithmetic facts.
 - Grade 5 "pilot" implementation of software product: *Fraction Nation*

- Professional Development:
 - Compilation of resources listing web-based mathematics sites for use by K-5 teachers.
 - AMC training for special education resource teachers to support mathematics instruction and improve student learning.
 - New teacher summer workshops (2 days) to provide training in the district's mathematics program for teachers new to Lexington.
 - Response to Intervention (RTI) Study Group to build capacity at Tier I and to determine appropriate Tier II and III interventions
 - Review of data collected from the "Student Support System Continuum for Mathematics" survey completed by all classroom teachers. The data will help the district to evaluate, monitor, and determine necessary professional development/training, as well as any curricular adjustments that need to be made as we strive for the "sustaining" level of achievement on the assessment tool.
 - Approval of an additional 1.0 FTE K-5 Mathematics Specialist/Coach in the FY11 budget will increase the capacity of our mathematics specialists to consult with classroom teachers and provide content and instructional leadership in mathematics education through coaching and modeling lessons at the building level.
 - Participation in the development of a standards-based reporting card.
 - Continued publication by Karen Tripoli, K-5 Department Head, of a communication document entitled "**MATH MATTERS,**" which includes vital and recent information and updates on elementary mathematics issues.

Middle School, 6-8

- Curriculum:
 - A *Scope and Sequence* for grades 6, 7, and 8 has been completed. (Appendix B)
 - A binder of resources and activities for each teacher, for each course, and each level was developed in order to support the goals and objectives outlined in the middle school curriculum outlined in the above-mentioned *Scope & Sequence* document. Each middle school mathematics teacher received a copy of this binder at the opening of the 2009-2010 school year.
 - New textbooks for the 8th grade Algebra I program have been purchased to replace current texts and more effectively support the revised curriculum in the FY11 academic year.
 - Introduction of a new course, "*Algebra I Extended*" designed to better meet the needs of our most advanced 8th grade students who will be studying the same concepts as are covered in the Algebra I course, but who will do so in greater depth and with an emphasis on a problem-solving approach.
 - Revision of the *Middle School Program of Studies* Mathematics section. (Appendix C)
 - Collaborative identification of the essential priority standards to be embedded in each course and each unit of study.
 - Collaborative creation of both common and summative assessments were developed by the mathematics faculty members of both middle schools for each course and level to ensure that the identified priority standards are being addressed, taught, and learned by students in the same courses across the district for consistent horizontal articulation.
 - Data regarding the performance of 5th grade students on their end-of-year mathematics assessment were compiled and sent to each middle school in an effort to provide valuable student information to 6th grade teachers at the start of

the new academic year regarding those skills mastered or assessed to be in need of reinforcement for their entering 6th graders.

- All 5th grade faculty members of the district's 6 elementary schools attended a joint meeting with both middle school principals and departmental chairs to share information about the middle school *Program of Studies* and to provide clarity around matters of placement/recommendations for course levels.
 - A strong focus has been placed on the need to use technology as an instructional tool so as to address the varied learning needs of students and to reinforce those skills that are required in a 21st century environment. The software program, *Fraction Nation*, has been implemented as a pilot at Clarke Middle School in the Math Intervention classroom. (*A demonstration of this program will be presented at Tuesday evening's LSC meeting.*)
 - The two middle school Math Intervention specialists, recommended and hired in 2007 continue to have positive impact on student achievement by providing "double-dosing" opportunities for struggling mathematics students. All students who scored "needs improvement" (NI) or "warning" (W) on MCAS are selected to be in the program. Depending on individual schedules, students received anywhere between two and four additional instructional time per week. The two intervention specialists regularly collaborate with each other and the mathematics teachers in preparing and reviewing student needs. Though this 2010 MCAS results have not as yet been received, last year's results indicated that 35% of students with a Warning score increased one level to Needs Improvement; 40% of students with a Needs Improvement score increased one level to Proficient.
 - The "Executive Functioning" class now in its third year in both middle schools, continues to successfully address intervention strategies related to students' capacities to organize, manage, and perform more efficiently in all programmatic areas.
 - Regular and special education co-teaching model classes continue to provide more collaboration between regular and special education teachers on a daily basis capitalizing on the multiple benefits provided by the delivery of content rich instructors and instructional strategy specialists.
- Professional Development:
 - Continued PLC work gathering and analyzing student data to refine instruction based on need.
 - Regular review of literature and discussions on current research at department meetings:
 - Executive Summary: Reasoning and Sense Making, NCTM.
 - Five Strands of Mathematical Proficiency, from Adding It Up: Helping Children Learn Mathematics, National Research Council, 2001.
 - "Dehumanized" by Mark Slouka, from the September 2009 issue of Harper's Magazine.
 - "No Problem: The Value of Struggling with Important Mathematics" by Marisa Ferrarese-Asarisi.
 - "Developing Mathematical Habits of Mind" by June Mark, Al Cuoco, E. Paul Goldenberg, and Sarah Sword, from the May 2010 issue of Mathematics Teaching in the Middle School.

- Highlights:
 - Both middle schools offer tremendous opportunities for students to engage in mathematical experiences outside of the classroom. After-school Math Teams are a popular activity at both Diamond and Clarke. Each school participates in nineteen (19) mathematics contests each academic year. Some of the competitions include: The Intermediate Math League of Eastern Massachusetts, Math Counts, the Continental Math League, the New England Math League, the American Math Competitions, Purple Comet, the Lexington Math Tournament, American Scholastic Math Association, and the Exeter, NH Math Club Competition.
 - Awards by Lexington students and teams are annually numerous for the above stated competitions. Both Clarke and Diamond are top scorers nearly every year. Clarke MS placed 1st for the last 4 years and Diamond was consistently in 1st place for the 9 years prior to that. Both schools have top scoring teams in MATHCOUNTS (1st place for 4 years running for Clarke MS). Seven out of sixteen students who have won trips to MATHCOUNTS nationals in the last 4 years have come from Clarke and Diamond; Both middle schools have consistently come in the top 3 at the state level for the New England Math League competition; Clarke MS has placed 1st in the Purple Comet for the last 3 years.
 - The most impressive piece of information that bears mentioning here is that EACH school has more than 100 students who are eager to participate and try out for these events. This level of interest clearly speaks to the amount of engagement our students have in the mathematics program. This interest is undoubtedly fueled by the passion and instruction provided by the department.
 - The First Annual Lexington Mathematics Tournament (LMT) is a contest that Lexington High School students organized and ran on a Saturday this year in an effort to “give back” to the middle school math programs that nurtured their own growth and development in this field. The LHS students wrote ALL the questions, administered all the testing, graded all the tests, designed a website, pursued the necessary funding, purchased awards, and ran an overall excellent competition at which Lexington middle schools had 5 participating teams who placed 1st, 4th, and 5th this year. Ten other districts entered their middle school teams in the competition. Generally, only one team per district attended, but Lexington had 5 teams representing both middle schools.

High School, 9-12:

- Curriculum:
 - An essential common core curriculum for each course and level of instruction has been created. The program is aligned to the *NCTM Standards* and *Massachusetts Frameworks*. All teachers have explicitly agreed to ensure their students would receive instruction in all identified topics, thereby establishing strong horizontal articulation.
 - As part of the professional learning community (PLC) work this year, each course team developed a summative assessment that will be administered at the end of the year to evaluate whether students can demonstrate their understandings of the “agreed to” priority standards. The resulting discussions about teaching and learning, assessment, and standards-based instruction have been substantive and have fostered a mutual accountability.

- Teachers will collate the results of these summative assessments and compare learning across sections of the same course at the beginning of the next academic year in order to further refine their work.
 - New textbooks have been reviewed and selected for purchase for the Level 1 pre-calculus and calculus courses for implementation in the FY11 academic year.
 - The performance records at mid-year of 9th grade students are sent to the 8th grade teachers so that they may see how their previous year's students are doing in their recommended mathematics courses. This exchange of information assists teachers in making future recommendations for placement and encourages face-to-face communication between teachers.
- Professional Development:
 - The design of summative assessments for each course at the high school has been guided and highly influenced by the work of nationally renowned assessment experts Larry Ainsworth and Mike Wasta in keeping with the collaborative philosophy of PLCs which focuses teacher attention on student data and the appropriate instructional response to the data. Four full-days of training were provided by these 2 individuals to the high school Leadership Team.

VI. Research and Literature:

It should be noted that the “backdrop” of the district’s work in any domain must be and should continue to be informed by research and studies at regional, national and international levels. In other words, the research review never ends. As we continue our local work, we concurrently remain focused on on-going studies that serve to inform our decision-making and thinking. Even where there exist differing points of view, research from multiple studies consistently agree and underscore the importance of the following essential ingredients in an effective mathematics curriculum:

- Increased collaboration and networking among teaching professionals at all levels and researchers (local PLCs) increases student achievement.
- Effort, **NOT** just inherent talent, counts in mathematical achievement.
- Research on the relationship between teachers’ mathematical knowledge and students’ achievement confirms the importance of teachers’ content knowledge. Consequently, continuous professional development and training for teachers is imperative.
- Teachers’ regular use of formative assessment improves their students’ learning.
- Children’s goals and beliefs about learning are related to their academic performance. When children believe that their efforts to learn make them “smarter,” they show greater persistence in mathematics learning. (We need to strive daily in our classrooms to defeat the erroneous idea that success is largely a matter of inherent talent or ability, not effort.)
- Finally, the CONTENT and PROCESS standards evoke the essential elements of a highly effective program that includes: mastery of skills and concepts, mathematical communication and thinking, positive attitudes towards mathematics, and critical views of teaching and learning. In other words, curriculum MUST simultaneously develop conceptual understanding, computational fluency, and problem-solving skills. These capabilities should be taught as mutually supportive, each facilitating the learning of the others. “Teachers should emphasize these interrelations; taken together, conceptual understanding of mathematical operations, fluent execution of procedures and fast access to number combinations jointly support effective and efficient problem solving.”

VII. Concluding Remarks:

I believe I speak on behalf of the entire group when I say that our review process continues to be an exhilarating experience for all. As part of our many discussions, there was one principle that never wavered and that was the group's commitment to do what was in the best interest of the students and their success and constant growth in field of mathematics. Since, as stated earlier in this report, curriculum is ever-evolving and instructional interventions for the wide range of diverse needs must be continuously assessed to respond to changing needs, the committee has resolved that the district should commit to offering continuing opportunities to maintain these important discussions on a regular basis and never again let a decade pass in between "formal" review cycles. The work of improving and modifying curriculum and the accompanying instruction must remain on-going in order to be the most current, the most powerful, and the most effective, for these are the standards of excellence to which the Lexington Public Schools has always aspired.

In summary, our work has helped to clarify grade-level expectations, has helped to inform instruction, and have led to more consistency of mathematics instruction across grades and across schools at all levels. End-of-year assessments have been established, common Informative assessments have been created at all grade levels as a result of focused PLC work, emphatic attention has been placed on instructional interventions designed to improve learning in all programs, and our MCAS have demonstrated that student performance/achievement has improved, as a result. Our work has taught us that the "work" is never truly over; instead it has emphasized the need to consistently and regularly review what we teach, how we teach, and what to do to continuously improve.

I look forward to answering any questions you might have when we meet next week Tuesday, June 8.

*Update on Year Three+ of the
Mathematics Curriculum Review*

*Lexington Public Schools
June 8, 2010*

*Carol A. Pilarski
Assistant Superintendent for
Curriculum, Instruction, and
Professional Development*



In Recognition and Appreciation

- All Principals
- All K-5 Classroom Teachers
- All Secondary Mathematics Teachers
- Special thanks to the leadership
 - Karen Tripoli, K-5
 - Josh Frost, 6-8, Clarke MS
 - Kent Findell, 6-8 Diamond MS
 - Gary Simon, 9-12



Curriculum Reviews . . . *should never be “over”*

- On-going review and analysis of the data
- Convergence of PLC work
 - Data collection & analysis (looking at student work)
 - Identification of Priority Standards/Essential Ideas
 - Creation of formative & summative assessments
- Convergence of Equity & Excellence Action Plan



“The Mission”

*The goal of the Lexington Public Schools mathematics program is to offer to all students a rich and engaging mathematics curriculum that focuses on important and essential mathematics, learned with understanding and depth. The program’s aim is to **enable every student to achieve full potential** as a mathematics learner, based on a conviction that **everyone can succeed** when challenged by high expectations and offered strong support. The program takes a balanced approach to developing proficient skills, conceptual understanding, and **mathematical habits of mind**. Students are given opportunities to explore and discover mathematical ideas, to build their mathematical knowledge, and to **cultivate their thinking, creativity, reasoning, and problem solving capabilities**. Teachers seek to create learning experiences that are developmentally appropriate; to address varied learning styles, and use a variety of mathematical approaches and representations. Students are encouraged to communicate their mathematical ideas, to become confident and perseverant in using mathematics, and to appreciate the power, relevance, and beauty of mathematics.*

NCTM Standards

- CONTENT

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

- PROCESS

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



The CHALLENGE

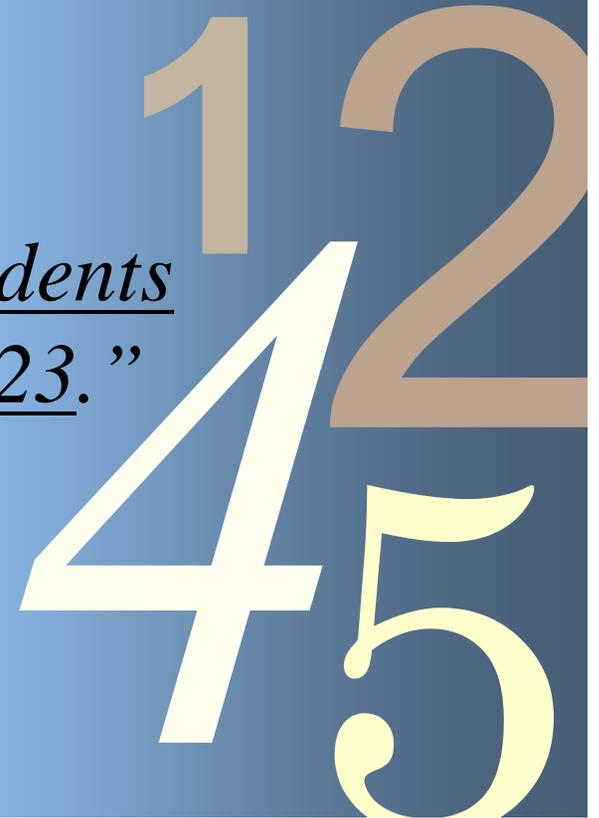
- Mathematics Instruction **cannot** be effective if it is based on either extreme . . .

Content or Process

- *“Students become more proficient when they understand the underlying concepts of math and they understand the underlying concepts more easily if they are skilled at computational procedures.”*



“Students entering Kindergarten in 2010 will graduate from HS in 2023. Educators can only guess at the problems those graduates will face and the corresponding mathematical competencies they will need. Still, educators must define and implement a K-12 Mathematics curriculum that will prepare students for the uncertain demands of 2023.”



What Mathematics should then be taught?

Lexington's goal: to strive continuously to find the **balance** that will assist students in *mastering the standards* **AND** in creating those mathematical "*habits of mind*" that will allow them to think, apply, and discover the mathematics they need to know in real-life applications.



What is a “Habits of Mind” Curriculum?

- Gives students the tools they need to use and understand what they have learned and not yet learned.
- Lets students “in” on the process of creating, inventing, conjecturing, and experimenting.



District-wide . . . *our sustained focus*

- Upload all completed K-12 documents onto *Atlas Rubicon*
- Continue district-wide Professional Development efforts to increase both content and instructional capacity for ALL teachers in ALL disciplines
- Continue targeted PLC work, collaborative efforts with special education, ELL, and the disenfranchised
- Continue to work on the development of a tiered intervention model (RTI)
- Provide regular opportunities for K-12 department members to converse, share, and visit each others' classes and schools (Collaboration is essential)



Accomplishments. . . Elementary, K-5

- Curriculum Document completed K-5
- Purchase & Implementation of ancillary materials for targeted instruction & differentiation
- End-of-Year summative assessments at each grade level
- Differentiated Guides distributed to each grade level teacher to enhance and extend instruction
- Training in Assessing Math Concepts (AMC) for K-2 and special education teachers
- M.E.L.P.
- *Mathpath* – EDCO initiative – Summer 2010



K-5 Accomplishments. . *continued*

- Grade 3 implementation of *FASTT* math software to increase automaticity and recall of basic facts
- Grade 5 “pilot” implementation of *Fraction Nation*
- RTI study group for mathematics
- New teacher summer workshops
- Approval of 1.0 FTE for K-5 Mathematics specialist/coach
- Participation in the development of a standards-based report card
- Continued publication of communication document: “*Math Matters*”



Accomplishments . . . Middle School, 6-8

- Development of a *Scope & Sequence: 6,7,8*
- Creation of a Resource Binder for each course, each level
- Continuing Work of Mathematics Intervention Specialists hired in 2007 yields tremendous impact
- Improved 2009 MCAS scores: 35% of students in the Warning category increased one level to Needs Improvement and 40% of students in N.I. increased one level to Proficient
- Continuation of Executive Functioning class now in its 3rd year
- Regular & Special Education co-teaching yields multiple benefits in content & instruction
- Purchase of new textbooks for the 8th grade Algebra I program to support the revised curriculum in FY11
- Introduction of new 8th grade course, “Algebra I Extended”



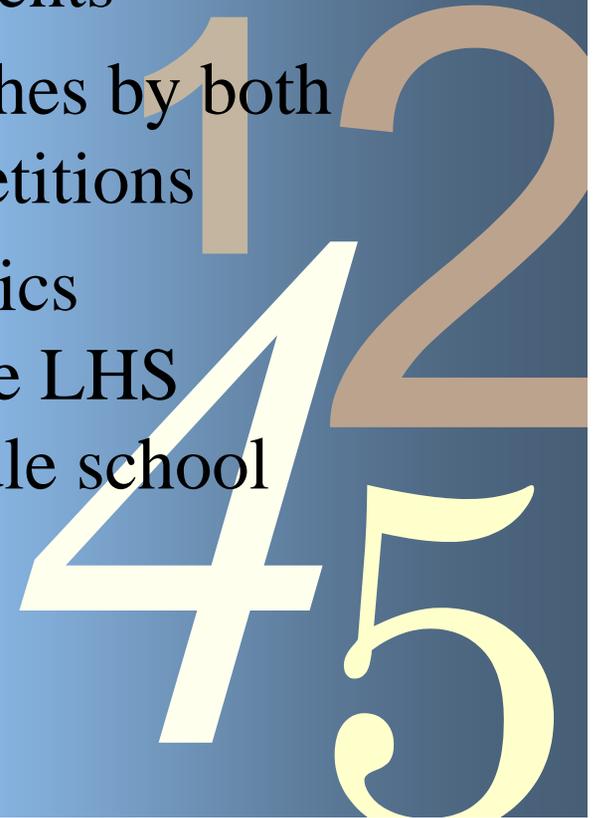
6-8 Accomplishments. . *continued*

- Creation of formative and summative assessments
- Joint meeting of 5th grade faculty with both middle school principals
- Implementation of “*Fraction Nation*” as a pilot in the Math Intervention class at Clarke
- On-going professional development: review and discussion of current literature



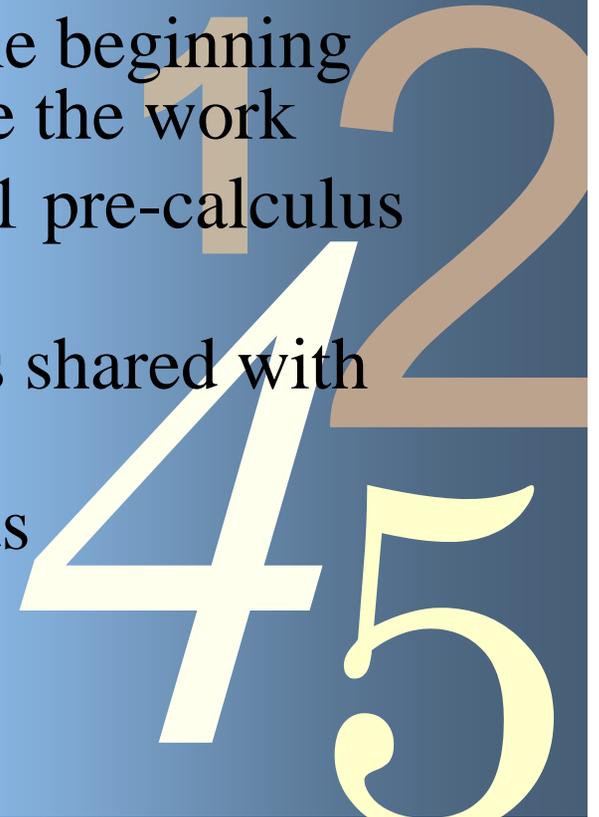
Middle School Math *Highlights*

- Tremendous opportunities for students to engage in math-related activities outside the classroom
- More than 100 students at **each** school are eager to participate and “try out” for these events
- Numerous awards and 1st place finishes by both schools in 19 different annual competitions
- The 1st Annual Lexington Mathematics Tournament (LMT) sponsored by the LHS students to “give back” to their middle school math experience



Accomplishments . . . LHS, 9-12

- Creation of CORE curriculum for each course and level of instruction
- Development of *Summative Assessments* for each course based on “agreed to” priority standards – PLC work
- Collaborative review of these results at the beginning of the new academic year to further refine the work
- Purchase of new textbooks for the Level 1 pre-calculus and calculus courses in FY11
- Performance records of 9th grade students shared with previous year’s 8th grade teachers
- On-going examination of course standards



Research & Literature

Research & Literature should consistently and continuously remain the “backdrop” for any programmatic decisions

- Collaboration and networking increases student achievement
- Effort, **NOT** just inherent talent, counts in achievement
- Children’s goals and beliefs about learning are related to their academic performance



Research & Literature . . . *continued*

- Informative assessment improves student learning; it provides data that informs “next step” instruction.
- Research on the relationship between teachers’ mathematical knowledge and students’ achievement confirms importance of teachers’ content knowledge and instructional capacity



Most Importantly!

When children **BELIEVE** that their efforts to learn make them “smarter,” they show greater persistence and desire to learn.”

It is our job to help them believe this!



QUESTIONS ?

1 2
4 5

