

Winchester Public Schools

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

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INTRODUCTION

Under the direction of Superintendent Dr. James Marini, the Winchester Public Schools have started a new process of reviewing its curriculum and academic programs. Mathematics was the first area to begin undergoing this review, in February 2004. This review process—gathering information, synthesizing results, making sense of opinions, determining findings, and recommending changes—was a major challenge on which teachers and administrators have focused this past year.

RATIONALE

During the Winchester Public Schools' strategic planning process in Fall 2003, members of the community expressed a need to address a number of issues and topics related to math. It was decided that the Winchester Public Schools would undergo a complete review of its curriculum, beginning with math. Using information obtained during the planning process, surveys were designed to elicit information about relevant topics and issues from all audiences: parents, students, and teachers. This information was analyzed and used to make recommendations to promote positive changes in the math program.

PURPOSE

There were three primary objectives of the Math Program Review:

- To conduct a comprehensive review of the content and delivery of the K–12 math program.
- To develop and implement recommendations for improvement to curriculum content, delivery of instruction, and effective communication.
- To create a model for comprehensively reviewing all curriculum areas.

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PROCESS

The Superintendent, Assistant Superintendent, and a parent volunteer who served initially as project manager met to identify the review's framework. Once the framework was outlined, the Math Program Review ("MPR") Team was formed, consisting of elementary, middle, and high school teachers as well as the Director of Mathematics and the Assistant Superintendent.

Team members initially worked with the project manager to understand the goal and scope of the program review. The project manager and team members facilitated working sessions with teachers to develop parent, student, and teacher surveys. A Cambridge-based research firm, STS Market Research, was hired to check for question bias and, in the fall of 2004, distributed surveys to parents. The student and teacher surveys were conducted in the spring of 2004.

- Approximately 2,000 WPS parents were mailed surveys. 372 parents responded (1/2 elementary parents; 1/4 middle school parents; and 1/4 high school parents) and all results were included in the data analysis.
- All elementary students (grades 1–5) were surveyed. Approximately 500 surveys were randomly selected for data analysis.
- All middle school students were surveyed. Approximately 300 surveys were randomly selected for data analysis.
- Many of the students in grades 9 through 11 were surveyed. Approximately 280 high school student surveys were randomly selected for data analysis.
- All elementary teachers and middle and high school math teachers were given surveys. 85 teachers responded and all results were included in the data analysis.

STS sorted the survey data collected by grade span and by school. The MPR Team began meeting in the summer of 2004 to analyze and synthesize the findings of the surveys and other data. The MPR Team has met multiple times during the current school year to generate final recommendations. Review results have been shared with elementary teachers, middle and high school math teachers, and administrators. The MPR Team's final recommendations will be shared with the school committee on May 10, 2005.

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FOCUS

Through the use of anonymous surveys, parents, teachers, and students were asked questions that focused on math curriculum, classroom instruction, and math support. Below is a succinct list of topics covered in the surveys (in alphabetical order):

- Classroom Practices/Pedagogy
- Content
- Curriculum
- Effective Communication
- Extra Help/Teacher Support
- Homework
- Pacing
- Professional Development
- Standards and Expectations
- Students with Advanced Skills in Mathematics
- Students with Disabilities
- Student Placement/Leveling
- Supplies/Resources

Teacher (grades K–12) and student surveys (grades 1–11) were collected in Spring 2004. Parent surveys were collected in Fall 2004. In addition to the survey results, the following data also was used to analyze the effectiveness of the math curriculum (in alphabetical order):

- Appeals/Overrides
- AP Courses
- Classroom Expectations
- Course Withdrawals
- Math Curriculum Area Steering Teams (C.A.S.T.)
- MCAS Scores
- SAT Scores
- Student Distribution in Courses
- Teacher Professional Development
- Technology Resources

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EXECUTIVE SUMMARY OF RESULTS

Overview

In general, the Winchester Public Schools' math program is effective in teaching math skills to students. The district's MCAS scores, which are only one measure of student success, consistently rank high when compared to other districts in the commonwealth. For 2004, overall MCAS math rankings in Massachusetts were as follows: Grade Four (2); Grade Six (3); Grade 8 (18); and Grade 10 (30). Four of Winchester's five elementary schools ranked among the commonwealth's top ten schools. The MPR team also evaluated other measures of success in determining the effectiveness of the math program; these measures are shared in the complete review report.

Although the district has evidenced success in teaching math skills to its students, there are issues within the math program that must be addressed, such as: components of the Everyday Math program, middle school leveling, consistency of expectations, middle school and high school course offerings for students of all abilities, overrides and appeals, extra help and tutoring, classroom practices, professional development, and teacher collaboration.

At each of the elementary, middle school, and high school levels, areas of strength and weakness were identified; some of these areas are succinctly summarized below. The complete review report, including findings and recommendations, follows the Executive Summary.

Elementary

Review results regarding the Everyday Math program, which is used in all elementary grades, indicated an overall positive feeling among parents, students, and teachers. In addition to objective MCAS results that indicate the program's success, the surveyed groups generally reported that the program was effective in teaching students mathematical skills. In general, parents, teachers, and students indicated that they understood concepts taught in class. The philosophy behind the Everyday Math program appears to be understood by most teachers and parents; however, not all teachers and parents agree with the philosophy.

The program appears to pose difficulties for some students with language-based learning disabilities. Additionally, some teachers have difficulty using the Everyday Math program to challenge students with advanced skills in mathematics and require supplemental materials to ensure that students are challenged to their full potential. A lack of consistency within the grade-levels with regard to expectations of students, homework, class work, curriculum coverage, and assessments was revealed at some schools.

The program is fast-paced, and some teachers reported an inability to adequately cover all units during the course of the school year. A need for formal training in the Everyday Math program for both classroom teachers and teachers of students with disabilities also was noted.

In response to issues identified, the MPR team has proposed a number of recommendations, including the creation of an Elementary Math Coordinator position.

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EXECUTIVE SUMMARY OF RESULTS (CON'T)

Middle School

Overall, the middle school math review indicated that the middle school math program is strong; however, areas for improvement were identified. The review revealed some issues with the seventh grade math program as it is currently structured. In comparison to sixth and eighth graders, seventh graders reported more difficulty understanding math concepts presented in class, requested additional time to think about/respond to questions in class, and requested a slower pace of class.

Additionally, the percentage of students scoring in the “needs improvement” or “warning” categories on the Grade 8 MCAS exam was higher in the eighth grade than in any other grade in the district taking a math exam. Overall improvement in scores has been made in the past few years; however, progress has been at a slower rate than that of other grades, and no progress was made from 2003–2004. It is possible that the current seventh grade math program is impacting eighth grade MCAS scores.

These results related to the seventh grade math program need to be further investigated and remedies put in place to ensure a strong math program throughout the entire middle school. The recommendation to add an additional level of math in the seventh grade—which would allow for more appropriate placement of students in order to better help them develop at their own pace—will be implemented in the 2005–2006 school year.

High School

The high school math program is strong; however, areas for improvement were identified. There is a need to reexamine the flow of courses as well as the variety of course offerings, in order to meet the needs of all students at the high school. There are no courses beyond Informal Geometry offered for students who struggle with math, nor are there higher-math electives for students who have a strong interest in math.

While parents in general indicated that they are satisfied with their child’s placement in math, the appeals process for students and parents who disagree with their placement was identified as needing review, revision, and consistent implementation.

The implications of larger class sizes on the quality and effectiveness of teaching were identified by both teachers and parents. Physical classroom space must be reevaluated.

Both teachers and parents reported a need for more communication and collaboration between classroom teachers and teachers of students with disabilities.

High school teachers unanimously requested more math-specific professional development and further instruction in differentiated instruction.

There is a need to review textbooks for clarity and usefulness, based on student responses to the survey.

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EXECUTIVE SUMMARY OF RESULTS (CON'T)

Conclusion

The findings above, as well as findings at all levels related to classroom practices and pacing, extra help and homework, instruction for students with disabilities, student placement/leveling, supplies, technology, and professional development, will be discussed in further detail in the full report. The report includes detailed recommendations for improvement.

MAJOR COST IMPLICATIONS FOR IMPLEMENTING RECOMMENDATIONS

<u>Description</u>	<u>Cost</u>
Elementary Math Coordinator	\$50,000–\$70,000
Funding for WHS Technology LCD Projectors Software Training	\$50,000–\$70,000
10 th Grade MCAS Course	\$15,000–\$20,000
WHS Math Tutoring Center	<u>\$15,000–\$20,000</u>
SUBTOTAL	\$130,000–\$180,000

DOES NOT INCLUDE (costs TBD):

Funding for Elementary Technology

Funding for Middle School Technology

Textbooks

Professional Development

Supplies/Resources

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CURRICULUM

Addressed in this section are review results related to Classroom Practices, Content/Curriculum, and Pacing. The findings and recommendations related to these topics have been categorized by Elementary, Middle School, and High School.

Elementary (“Everyday Math”-specific)

Note: The Everyday Math curriculum, created by the University of Chicago, has been used in Winchester’s K–5 grade classrooms for approximately 17 years.

Findings:

Overview

1. Students in grade four currently are the only elementary students who take an MCAS exam on the subject of mathematics. Among all Massachusetts communities, Winchester’s district-wide fourth grade MCAS scores ranked second in the state in 2004, and fifth in the state in 2003.

In 2004, four of Winchester’s five elementary schools were ranked in the top ten schools in the state (Lynch School did not rank in the top ten). 85% of students scored in the Advanced or Proficient category, 13% in the Needs Improvement category, and 2% in the Warning category. Additionally, the combined Advanced and Proficient scores for grade four has increased 12% over the past four years.

2. 91% of elementary teachers reported that they understood the philosophy behind the Everyday Math program. However, only 71% believed in the benefits of the Everyday Math program (19% were neutral and 10% disagreed) and only 65% “liked” the program. Disagreement with the program was most strongly indicated at the Muraco, Lincoln, and Vinson-Owen schools.
3. Through the open response section of the survey, three comments from parents indicated they did not understand/agree with the philosophy behind the Everyday Math program.
4. 18 out of 134 of parent respondents selected “no Chicago Math [Everyday Math]/go back to traditional methods” as a change to bring improvement to the mathematics curriculum in the Winchester Public Schools.
5. Fourteen parent open response comments reflected their satisfaction with the Everyday Math program and elementary teachers. Phrases used by parents included: “I’m satisfied with caliber and quality;” “I believe it’s working;” “happy with the program;” “pleased with the level of competency;” “I like the spiral learning structure;” “I do like the way the theories are revisited;” the results show the balance is good; “program is sound and challenging;” “many opportunities to improve math;” and “are excellent teachers.”

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CURRICULUM (CON'T)

6. With regard to math expectations, parents wanted their children:

- “to understand the fundamental concepts” (33%),
- “to enjoy learning the material” (19%),
- “to utilize math concepts in everyday life” (18%),
- “to excel in math” (16%), and
- “to feel confident/comfortable in math (16%).

Content/Curriculum

7. 62% of elementary teachers agreed that their students arrived prepared for math class at the beginning of the year; 12% disagreed and 26% were neutral. Agreement about preparation was lowest among Lynch teachers (36%).
8. 45% of elementary parents agreed that the mathematics program prepared their children for success on state and other standardized assessments; another 50% reported a neutral opinion and 5% disagreed.

Classroom Practices

9. When asked whether there was consistency within the grade level with regard to expectations of students, homework, class work, curriculum coverage, and assessments, net agreement from teachers of the five elementary schools ranged from 23–75% (Ambrose, 53%; Lincoln, 69%; Lynch 23%; Muraco, 60%; Vinson-Owen, 75%).
10. 8% of Lynch and 11% of Muraco students reported that they use their math reference book “a lot,” compared to an average of 29% usage among the other three elementary schools. (Ambrose reported the highest usage of 36%).

Similarly, 36% of Lynch and 19% of Muraco students reported that the reference book was helpful, compared to 59% of students at other elementary schools.

Further investigation by the Math C.A.S.T. determined that the reference books are not used because every class does not have a set.

11. 76% of elementary parents reported that their children consistently understood mathematical concepts/topics taught in class; 15% were neutral and 9% disagreed.
12. 90% of elementary students reported that their teachers were “good at explaining math;” 2% disagreed and 8% reported that they didn’t know.

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CURRICULUM (CON'T)

13. When asked what three things could make them understand math better, students said:

- “spend more time explaining” (28%),
- “play more math games” (23%),
- “more directions/shortcuts/tricks” (18%), and
- “offer individual help” (18%).

Pacing

14. 51% of elementary teachers reported that they did not have enough time in the year to adequately cover all [Everyday Math] course topics; 30% believed they did have enough time to cover topics; the remainder of teachers was neutral.

15. 43% of teachers felt that “time, too fast, too many concepts” were some of the greatest weaknesses of the Everyday Math program. This sentiment was most strongly reported by Muraco (67%), Lynch (64%), and Vinson-Owen (50%) teachers.

Recommendations:

Overview

- a. Because of the success it has demonstrated over the years, as measured by state and national standards, the Everyday Math program should be continued as the elementary math curriculum.
- b. The district should hire an Elementary Math Coordinator who will oversee pacing and completion of curriculum each year, provide training to help differentiate instruction, coordinate collaboration among teachers, and coach teachers to use effective teaching strategies. The Coordinator will ensure that teachers remain current with Everyday Math curriculum revisions.
- c. Led by the Elementary Math Coordinator and the Assistant Superintendent, the district should focus resources on improving student performance at the Lynch School.
- d. At staff meetings, principals should review the Everyday Math program with staff to encourage understanding and support of the program. The research on the program, as well as its philosophy, should be discussed.
- e. At curriculum nights/open houses, distribute the introductory parent letters “Introduction to X Grade Everyday Mathematics,” in order to explain the philosophy behind the Everyday Math program.

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Content/Curriculum

- f. At the first building-based grade-level meeting in September of each year, teachers in grades 2–5 should review the previous year’s end-of-the-year assessments to analyze strengths and weaknesses. This will provide information to teachers on their students’ performance the previous year and will address the preparedness concern.
- g. Principals should provide opportunities for vertical grade-level meetings for teachers to share and discuss grade-level expectations.
- h. The after-school mathematics Successmaker program at the Lynch school should be continued, to help students improve their mathematics skills. This may help them perform better on the MCAS exam.

Classroom Practices

- i. Please see recommendations under the Professional Development section of this report. These recommendations address training and collaboration designed to alleviate problems with consistency.
- j. Building principals, the Assistant Superintendent, and C.A.S.T. members should work closely with teachers to coordinate efforts that address the following: consistency within the grade-level with regard to expectations, homework, class work, curriculum coverage, and assessments. This should be addressed at both school-based and system-wide meetings.
- k. Principals of the elementary schools should facilitate school-based study teams to discuss best-practices in teaching Everyday Math lessons during release time or faculty meetings.
- l. Building principals, the Assistant Superintendent and C.A.S.T. members should work closely with teachers to ensure that every grade 3–5 classroom is supplied with a set of math reference books.
- m. In utilizing all components of the Everyday Math program, and to reinforce basic concepts and skills, teachers should incorporate regular use of the program’s games into their lessons.

Pacing

- n. Teachers should continue to meet each February by grade level to analyze the data from mid-year assessments to further inform instruction.
- o. In order to satisfactorily complete all units, principals should utilize building-based, grade-level meetings to enhance teacher understanding of pacing.

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- p. Working closely with the Assistant Superintendent, the Elementary Math Coordinator, and teachers, the elementary principals should ensure that the Everyday Math program is implemented consistently and completely.

Middle School

Findings

Overview

1. In examining Winchester's MCAS results for the past four years, the percentage of students scoring in the advanced and proficient categories has increased each year for students in grades four, six, and ten. When the middle school grade MCAS scores are compared to other districts in the Education Collaborative ("EDCO"), WPS performs exceptionally well (See Appendix 1).
 - From 2001 to 2004, the combined Advanced and Proficient scores for grades four and six each increased 12% overall; grade 10 increased 5% overall.
 - The combined Advanced and Proficient scores for grade eight increased overall from 2001–2004; however, they decreased 3% from 2003 to 2004.
 - In 2004, 27% of eighth graders were in the Needs Improvement or Warning categories, compared to 15% of fourth and sixth graders and 16% of tenth graders in these same categories.
2. Middle school textbooks and resources are aligned with the Massachusetts State Frameworks and National Council of Teachers of Mathematics ("NCTM") standards. However, not all curriculum units are written in the Understanding by Design format.
3. With regard to math expectations, middle school parents wanted their children:
 - "to understand the fundamental concepts" (23%),
 - "to excel in math" (19%),
 - "to utilize math concepts in everyday life" (19%),
 - "to acquire strong math skills" (19%), and
 - "to do well/best of their ability" (17%).

Content/Curriculum

4. When asked whether their teachers clearly explained math concepts, 48% of seventh graders disagreed, compared to 9% and 17% disagreement among sixth and eighth graders, respectively.
5. 58% of middle school parents agreed that the mathematics program prepared their children for success on state and other standardized assessments; another 33% reported a neutral opinion and 9% disagreed.

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6. 42% of middle school teachers agreed that their students arrived in class at the beginning of the year prepared for math class, compared to 63% of high school and 61% of elementary teachers.
7. 58% of middle school teachers reported that their students would benefit from a course devoted to MCAS skills.

Classroom Practices/Pacing

8. 92% of middle school teachers reported that there is consistency within the grade level with regard to expectations of students, homework, class work, curriculum coverage, and assessments; 8% were neutral and no teachers disagreed.
9. 39% of seventh graders felt they did not have enough time to think about and respond to questions/problems, compared to 11% and 12% of sixth and eighth graders, respectively.
10. When asked to rank the amount of time spent on each math section in class,—on a scale of one (“too little time”) to five (“too much time”)—29% of seventh graders reported “too little time,” compared to 13% and 18% of sixth and eighth graders, respectively.
11. Students were polled as to what three pieces of advice they would give to their teachers.
 - Sixth grade students advised:
 - “less homework” (29%),
 - “more real life problems/fun activities” (22%), and
 - “explain concepts more/clearer” (15%).
 - Seventh grade students advised:
 - “explain concepts more/clearer” (26%),
 - “slower pace on new/difficult concepts” (19%),
 - “make sure students understand” (17%), and
 - “less homework” (15%).
 - Eighth grade students advised:
 - “explain concepts more/clearer” (28%),
 - “allow for reviewing before tests” (20%), and
 - “be patient when class doesn’t understand concepts” (15%).
12. 58% of middle school teachers felt they did not have enough time in the year to adequately cover all course topics; 33% agreed that they did have enough time and 8% were neutral.

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Recommendations

Overview

- a. The annual eighth grade MCAS item analysis (done in-house) should be reviewed for specific areas of strength and weakness among the students. Using this information, teachers should be encouraged to implement regular practice on MCAS problems to encourage familiarity with the various types of exam questions and topics. Middle school math teachers should continue with vertical team meetings to examine scope and sequence of topics covered, especially in the seventh and eighth grades. Benchmarks should be reviewed to determine when topics should be mastered by the eighth grade.
- b. Students should receive more exposure to pre-algebra concepts in the seventh grade, to allow them to develop skills necessary to solve algebraic concepts on the eighth grade MCAS exam. The MS/HS C.A.S.T members can review and reinforce the implementation of this during the 2005–2006 school year.
- c. To maintain currency with state frameworks and standards, the Director of Mathematics and teachers in the math department should conduct an inventory of the current math curriculum guides so the department can update course syllabi, curriculum maps, and exit outcomes, as well as develop units in the Understanding by Design format.

Content/Curriculum

- d. Further investigation should be done to determine in which grade level or content areas teachers are reporting lack of preparation of students. The building principal and the Director of Mathematics should coordinate vertical meetings so that grade 6–8 math teachers can review expectations when students move on to the next grade.
- e. Sixth grade math teachers should be trained in the Everyday Mathematics program to aid in student transition.
- f. Please see recommendation below regarding an additional seventh grade math level, to address student concerns regarding clarity of explanations of math concepts.

Classroom Practices/Pacing

- g. Teachers should be encouraged to use more “wait time” when asking questions in class.
- h. A department meeting should be utilized to discuss lack of instructional time to cover all course topics. Content in all courses should be reviewed by teams of teachers for overlap and excess to determine if curriculum can be streamlined.

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- i. The Director of Mathematics and teachers in the math department should look at ways to improve teaching strategies, such as:
 - Sharing best-practices and strategies at department meetings. (For example, checking for student understanding before the end of class.)
 - Continuing to recommend that teachers take the *Studying the Skillful Teacher* course.
 - Purchasing the *Activators and Summarizers* booklets for teachers (through the *Studying the Skillful Teacher* course), which provide a wide variety of strategies to start and end classes to check for student understanding.
- k. Teachers should be encouraged to visit other top-ranked middle schools to seek their best practices. Knowledge gained should be shared with other Winchester colleagues at department meetings.
- l. To address student concerns regarding explanations of concepts, slower pacing, and student understanding, please see recommendation below regarding an additional seventh grade math level.
- m. To address student concerns regarding a desire for less homework, please see recommendation on page 21 of the Homework section of this report.

Comprehensive Recommendation to address Content/Curriculum/Classroom Practices/Pacing at the Middle School Level:

- n. The findings above outline a higher level of dissatisfaction/lack of comprehension within the seventh grade, as compared to the sixth and eighth grades. Seventh graders appear to be struggling with comprehension in class, amount of time given to answer questions, helpfulness of class work in completing homework, and amounts of time spent on homework.

Currently, there are only two levels of math offered at the seventh grade: Pre-Algebra (Advanced) and Middle School Math. There is a wide spectrum of students in both of these classes, ranging from advanced students (who quickly understand concepts) to less advanced students (who need considerably more help understanding concepts). Such a wide range of abilities in class does not allow for teachers to adequately address students' individual learning styles and needs.

Given the level of response regarding students' ability to comprehend concepts, it is recommended that a third level of math be created for the seventh grade. This third level would allow for students to be more appropriately placed in courses according to developmental level. Students would be adequately challenged at their individual skill level. Having three levels of math (Advanced Pre-Algebra, Pre-Algebra, and Middle School Math) would allow students to more easily move between levels both during the year and between years. The textbooks used for the Advanced Pre-Algebra and Pre-Algebra courses would be the same.

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High School

Findings

Overview

1. When tenth grade MCAS scores are compared to other EDCO districts, WPS performs exceptionally well (see Appendix 2).
2. While WHS's Math SAT I scores are not as high as many other EDCO districts (12th out of 15), it should be noted that Winchester does score 16th out of over 160 public high schools in Eastern Massachusetts (see Appendix 3). These scores are reported by *Boston Magazine* (9/04).
3. High school textbooks and resources are aligned with the Massachusetts State Frameworks and NCTM standards. However, not all curriculum units are written in the Understanding by Design format.
4. With regard to math expectations, high school parents wanted their children:
 - “to understand the fundamental concepts” (30%),
 - “to excel in math” (22%),
 - “to get good MCAS/SAT scores” (17%), and
 - “to utilize math concepts in everyday life” (15%).

Content/Curriculum

5. Some high school parents (23%) felt that math courses offered at WHS did not meet their child's needs, interests, and/or abilities.
6. There currently are no C2-level courses beyond Algebra I and Informal Geometry offered at WHS. Standardized tests, such as the S.A.T., now test skills taught in Algebra II.
7. An average of 63% of high school teachers agreed that students arrived at the beginning of the year prepared for their math class; 26% were neutral and 11% disagreed.
8. 58% of high school parents agreed that the mathematics program prepared their children for success on state and other standardized assessments; another 26% reported a neutral opinion and 16% disagreed.
9. 59% of high school teachers reported that their students would benefit from a course devoted to MCAS skills.
10. When asked whether their teachers clearly explained math concepts, an average of 49% of high school students agreed; 25% were neutral and 26% disagreed. Disagreement was strongest in the ninth and eleventh grades (27% and 28% respectively) and less strong in the tenth grade (21%).

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11. When asked whether explanations and examples in their math textbook clearly illustrated math concepts, 32% of high school students agreed, 36% disagreed and 32% were neutral.

Classroom Practices

12. 85% of high school teachers reported that there is consistency within a course with regard to expectations of students, homework, class work, curriculum coverage, and assessments; 11% were neutral and 4% disagreed.
13. Students were polled as to what three pieces of advice they would give to their teachers. They advised:
 - “allow for reviewing before tests” (20%),
 - “less lecturing/more examples and applications” (15%), and
 - “slower pace on new/difficult concepts” (15%).
14. 62% of students reported that their teachers “frequently” call on them to solve math problems; 36% reported “sometimes” and 3% reported “never.”

Pacing

15. 27% of high school teachers reported not having enough time in the year to cover all course topics.
16. 56% of high school students felt they had enough time to think about and respond to questions/problems in class; 27% were neutral and 17% disagreed. Of the 17% who disagreed, 53% were in Honors/AP, 45% in C1, and 2% in C2 classes.

Recommendations

Overview

- a. The Director of Mathematics, teachers in the math department, and members of the guidance staff should re-examine the flow of courses being offered to meet the needs of all levels of students. The number of available courses, particularly for C2 level students in the eleventh and twelfth grades, also should be reviewed. The Director of Mathematics and the math department should share their findings with the building principal and create action plans for addressing this issue.
- b. An MCAS preparation course at WHS for at-risk students should be established. This would be offered to students in addition to their regular math course.

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CURRICULUM (CON'T)

Content/Curriculum

- c. The Director of Mathematics and teachers in the math department should look at ways to improve teaching strategies, such as:
 - Sharing best-practices and strategies at department meetings. (For example, checking for student understanding before the end of class.)
 - Continuing to recommend that teachers take the *Studying the Skillful Teacher* course.
 - Purchasing the *Activators and Summarizers* booklets for teachers (through the *Studying the Skillful Teacher* course), which provide a wide variety of strategies to start and end classes to check for student understanding.
 - Encouraging teachers to visit other highly-regarded districts to seek their best practices and share what they have learned with their colleagues.
- d. Teachers and the Director of Mathematics should review textbooks currently being used in all grades and sections to determine if replacements and/or supplementary materials are needed to provide students with better explanations and examples of math concepts. Recommendations should be presented to the Assistant Superintendent.
- e. Department meetings should be utilized to continue to monitor the curriculum coverage from grade-to-grade and course-to-course.
- f. Please see tutoring center recommendation on page 23.
- g. Teachers should analyze midterm and final examinations to determine strengths and weaknesses in curriculum and classroom instruction.

Classroom Practices

- h. The Director of Mathematics should facilitate course-wide development of alternative assessments and review activities to aid students in test preparation.
- i. Teacher teams should be created to collaborate and discuss strategies for maximizing student involvement in class. The building principal and Director of Mathematics should provide opportunities for this collaboration to take place during release days and faculty meetings.

Pacing

- j. A department meeting should be utilized to discuss lack of instructional time to cover all course topics. Teacher teams should review content in all courses for overlap and excess to determine if curriculum can be streamlined.
- k. The Director of Mathematics should facilitate collaboration among teachers of the same course regarding common pacing and goal setting.

References to "parents," "teachers," and "students" throughout this report refer to the parents, teachers, and students (1) who responded to the survey questions and (2) whose answers were randomly selected for data analysis. These terms do not refer to all parents, teachers, and students.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

HOMework

Elementary (Everyday Math-specific)

Findings:

1. 80% of elementary parents agreed that math class prepared their children to successfully complete homework assignments; 15% were neutral and 5% disagreed.
2. 83% of elementary students agreed that the math work done in class prepared them for homework assignments.
3. Students were surveyed regarding the amount of time spent on math homework per day. 43% of elementary students spend less than 15 minutes, 49% spend 15–30 minutes, and 8% spend more than 30 minutes each day.
4. 33% of elementary parents felt that their child’s math homework was “too easy;” 62% felt it was “just right” and 5% felt it was “too hard.”

Recommendations:

- a. Building principals should ensure that the Everyday Math program Daily Home Links are regularly assigned by teachers as homework. Teachers should review the directions of the Links prior to sending them home.
- b. Teachers should distribute all parent communications from the Everyday Math program. Principals should address the value of parent communications during faculty or building based meetings.
- c. The School Committee should establish a system-wide policy regarding homework at the elementary level to ensure consistency across the district.
- d. Parents should utilize the “Do Anytime Activities” outlined in each unit’s Family Letter sent home for those students who find regular homework assignments “too easy.”

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

HOMework (CON'T)

Middle School

1. 69% of middle school students agreed that the math work done in class prepared them for homework assignments.

Among middle school students, agreement with this statement ranged widely from 85% and 72% agreement at the sixth and eighth grade levels, respectively, to 50% agreement at the seventh grade level.

2. 16% of middle school students reported that their homework was not helpful in understanding concepts presented in class. Reports that homework was not helpful were strongest among the seventh grade (28%) and less strong in the sixth and eighth grades (12% and 10%, respectively).
3. Over 20% of middle school parents felt that work done in class did not prepare students to complete homework.
4. 77% of parents agreed that the level of difficulty of homework was “just right” for their students; 13% felt it was “too easy” and 10% felt it was “too hard.”
5. 56% of middle school students agreed that their math homework took a “reasonable” amount of time while 17% disagreed that homework took a “reasonable” amount of time. Disagreement was strongest among seventh graders (21%) and less strong among 6th and 8th graders (13% and 17%, respectively).

62% of students in the sixth, seventh, and eighth grades spent between 30–60 minutes on homework; another 32% of students spent less than 30 minutes. 6% of middle school students spent more than one hour on homework; approximately half of these students were in the seventh grade.

Recommendations:

- a. The principal, the Director of Mathematics, and teachers should coordinate their efforts to provide opportunities for teachers to discuss homework: quality, distribution, correcting, extra help, and time on homework. C.A.S.T. members should discuss homework issues during meetings and share their discussions with grade level colleagues during math meetings.
- b. The amount of time spent on homework (reported in Finding #5) is consistent with the guidelines outlined in the McCall Student handbook. However, it is primarily seventh graders who have been identified as spending more than the suggested amount of time on homework. It appears, therefore, that some seventh graders could be having difficulty completing their homework. Please refer to page 16 regarding the comprehensive recommendation for adding a third level of math to the seventh grade program.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

HOMework (CON'T)

- c. Teacher availability for extra help should be well-publicized each year.
- d. For students who are spending more time on homework, teachers should encourage them to participate in the Homework Club.

High School

Findings:

1. 55% of high school students agreed that the homework was helpful in understanding concepts presented in class and 22% disagreed. Disagreement was evenly distributed between C1 and Honors/AP students. Of the nine high school C2 students surveyed, three disagreed.
2. 64% of high school students felt the work done in class prepared them for homework assignments, 21% were neutral, and 15% disagreed. Of the 15% who disagreed, 33% of these students were in C2, 11% were in C1, and 19% were in Honors level classes
3. 67% of students reported “frequently” doing practice problems in class and 31% reported “sometimes” doing practice problems. 2% of students reported that they “never” work on practice problems in class; these were either C1 or Honors/AP students.
4. 77% of high school parents agreed that the level of difficulty of homework was “just right” for their students; 13% felt it was “too easy” and 9% felt it was “too hard.” However, over 30% of high school parents indicated that work done in class did not prepare students to complete homework.
5. Students were surveyed regarding the amount of time spent on math homework per day.

53% of high school students spent less than 30 minutes on math homework; another 40% spent between 30–60 minutes. In general, C1 students represented the majority (61%) of the “less than 30 minutes” group. Honors/AP students were the majority of the “30–60 minutes” group, representing 46% of the total. C2 students were evenly split between the “less than 30” minutes and the “30–60 minutes” category. 7% of high school students spent more than one hour on their math homework; 74% of these were Honors/AP students.

46% of high school students perceived that their math homework took a “reasonable” amount of time while 29% disagreed. This disagreement was evenly spread between C1 and Honors/AP students. Two of the nine C2 students surveyed disagreed.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

HOMework (CON'T)

Recommendations:

- a. The Director of Mathematics and teachers should use department meeting time to discuss the connection between class work and homework.
- b. A math tutoring center should be created at WHS. Recognizing that students are actively involved in extracurricular activities, the center would be open before, during, and after school to accommodate students' needs and schedules. Tutoring would be available to assist students in completing homework and preparing for tests. The center could be staffed by experienced students, volunteer retirees, hired math tutors, or teachers paid through stipends.
- c. Teacher availability for extra help should be well-publicized each year.
- d. Teachers should check for student understanding prior to the end of class to ensure homework is later successfully completed at home. Please see recommendation "c" under "High School Content/Curriculum" for recommendations on how to ensure this understanding.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STANDARDS AND EXPECTATIONS

Elementary (Everyday Math-specific)

Findings:

1. There were no direct survey questions related to standards and expectations asked of elementary parents.
2. Elementary students were asked their opinions of what their teachers expected of them. Over 80% of elementary students reported that their teacher expected them to “do their best” in math; 13% didn’t know and 7% disagreed.

Recommendations:

- a. Elementary teachers should meet both horizontally (teachers of the same grade) and vertically (teachers of different grades) to discuss expectations. Common planning time should be scheduled so that teachers can coordinate instructional strategies that ensure consistency in course content, homework expectations, and grading standards.

Middle School

Findings:

1. When asked whether their math teacher had made his/her expectations clear to students, 72% of middle school students responded favorably. Overall, an average of 12% of middle school students indicated that expectations were not made clear. Seventh graders had the strongest disagreement with this survey question, with 22% indicating that their teacher had not made his/her expectations clear.
2. 60% of middle school students reported that their math teachers had high expectations of them. 34% reported a neutral opinion and 6% disagreed.

Recommendations:

Please see recommendations below under “both middle school and high school.”

High School

Findings:

1. When asked whether their math teacher had made his/her expectations clear to students, 62% of high school students responded favorably. An overall average 18% of high school students indicated that expectations were not made clear.
2. 48% of high school students reported that their math teachers had high expectations of their students, while 35% were neutral. 17% of students reported that their teachers did not have high expectations of them; of these, 80% were C1 students.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STANDARDS AND EXPECTATIONS (CON'T)

Recommendations (for both Middle School and High School):

- a. Teachers should ensure expectations are clearly communicated to students and parents. Examples of how to do this are:
 - Post expectations on teacher Web sites
 - Have students and parents sign off at the beginning of the year that they have read and understood the expectations
 - Post expectations clearly in classroom

- b. The Director of Mathematics and/or principals should utilize department and/or grade-level meetings in the spring and fall to discuss standards and expectations that teachers make known to students (verbally or in print form).

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

EXTRA HELP/TEACHER SUPPORT

Elementary (Everyday Math-specific)

Findings:

1. 86% of elementary students reported that they felt comfortable asking their teacher for extra help; 8% disagreed and 6% did not know.
2. 67% of elementary students indicated that they “always” go to their teacher for extra help. 19% of students indicated they did not “always” go to the teacher for help and 14% “did not know.”
3. 4% of elementary parents reported that their child had a math tutor. Of the 11 students tutored, five received tutoring for remediation and six received tutoring for enrichment.

Recommendations:

- a. Teachers should continue to check for understanding with all students during lessons.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

EXTRA HELP/TEACHER SUPPORT (CON'T)

Middle School

Findings:

1. When asked whether they felt comfortable asking their teachers for extra help, 69% of middle school students responded affirmatively.
2. Among middle schoolers, an average of 13% disagreed that they felt comfortable asking for extra help; over 50% of those in disagreement were in the seventh grade.
3. 62% of middle schoolers indicated that they ask their teacher for extra help when they don't understand something in math class.
4. 80% of middle school parents indicated that they did know when their child's teacher was available for extra help; 15% were neutral and 9% disagreed.
5. 14% of middle school parents reported that their child had a math tutor. Of the 16 students tutored, nine received tutoring for remediation, five received tutoring for enrichment, and two did not identify the purpose of the tutoring.
6. Over 70% of the middle school students take part in extra-curricular activities that range from 5–10+ hours per week; the remainder of students take part in activities that range from 1–5 hours per week.

Recommendations:

- a. During a staff meeting, the Middle School principal should encourage staff to meet with their cluster of students to discuss the issue of seeking extra help from teachers.
- b. All teachers should spend time in class discussing with students how to prepare, study, or complete assignments, and how to help themselves if they are unclear about a concept or unsure of themselves. This includes how to: use the textbook, use the teacher's Web site, and access help from the teacher, a friend, or the Internet.
- c. Teachers should ensure that their availability for extra help is well-publicized to students and parents.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

EXTRA HELP/TEACHER SUPPORT (CON'T)

High School

Findings:

1. When asked whether they felt comfortable asking their teachers for extra help, 65% of high school students responded affirmatively.
2. Among high schoolers, an average of 18% disagreed that they felt comfortable asking for extra help. Disagreement was strongest among 9th graders (22%), and less strong among 10th and 11th graders (13% and 18%, respectively).
3. 62% of high schoolers reported that they ask their teacher for extra help when they don't understand something in math class. Tenth graders asked most frequently (73%), and ninth graders and eleventh graders asked the least frequently (53% and 51%, respectively).
4. High school students use multiple avenues when seeking extra help. These include asking friends/classmates (80%), referring to textbooks/notebooks (77%), and asking teachers (61%).
5. 22% of high school parents reported that their child had a math tutor. Of the 26 students tutored, 19 received tutoring for remediation, five received tutoring for enrichment, and two did not identify the purpose of the tutoring.
6. 70% of high school parents indicated that they did know when their child's teacher was available for extra help; 11% were neutral and 19% disagreed.

Recommendations:

- a. Teachers should spend time in class discussing with students how to prepare, study, or complete assignments, and how to help themselves if they are unclear about a concept or unsure of themselves. This includes how to: use the textbook, use the teacher's Web site, and access help from the teacher, friend, or Internet.
- b. Please see tutoring center recommendation on page 23 of this report.
- c. Teachers should ensure that their availability for extra help is well-publicized to students and parents.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

PROFESSIONAL DEVELOPMENT

Elementary (Everyday Math-specific)

Findings:

1. Across the district, 27% of elementary teachers disagreed that the district provided adequate professional development opportunities related to the Everyday Math program.
2. C.A.S.T. members reported that there is limited formal training for new or existing teachers with regards to the Everyday Math program. New teachers are expected to read the curriculum and determine how to teach it on their own.
3. 19% of teachers district-wide reported they did not have enough training to successfully differentiate math instruction in the classroom. This sentiment was most strongly reported among Vinson-Owen teachers (31%) and Lincoln teachers (21%).
4. 21% of teachers reported a neutral opinion when asked whether the math skills learned in their class adequately prepared students for the next year's requirements.
5. 12% of elementary teachers neither agreed nor disagreed that they had the appropriate supplies needed to effectively teach the Everyday Math program. The neutral opinion was most strongly reported at Lynch (54%) and Muraco (30%).

Recommendations:

- a. The district should hire an Elementary Math Coordinator to determine professional development needs specific to the Everyday Math program, research opportunities for professional development, and coordinate training sessions.
- b. The Assistant Superintendent/Elementary Math Coordinator should provide formal training for teachers new to the Everyday Math program at the start of every school year.
- c. The Assistant Superintendent/Elementary Math Coordinator should offer additional, ongoing training opportunities for all teachers after the start of the school year. This would ensure that both new and experienced teachers understand the Everyday Math program, answer any questions they may have, and provide suggestions for teaching strategies.
- d. Teachers of grades 1–5 should regularly utilize the quarterly checklists/profile sheets, which show the skills each child is developing, and their progress in meeting learning goals, to ensure that students are adequately prepared for the following year.
- e. Kindergarten teachers should utilize the end-of-year assessment checklists to ensure that students are adequately prepared for the following year.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

PROFESSIONAL DEVELOPMENT (CON'T)

- f. The mentor leaders should focus two elementary mentor sessions each school year on the Everyday Math program to ensure new teachers have the support they need. Elementary Math C.A.S.T. members should be utilized to facilitate the meetings, if necessary.
- g. Building principals should provide opportunities for teachers to visit other classrooms to observe and share successful teaching strategies in mathematics.
- h. Building principals and the Assistant Superintendent/Elementary Math Coordinator should provide regularly scheduled opportunities (faculty meetings, release days, grade-level meetings) for collaboration between teachers of the Everyday Math program to share best-practices and teaching strategies, answer questions, and address pacing.
- i. The Assistant Superintendent should offer district-wide math-specific differentiated instruction training for all teachers, teaching assistants, and specialists.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

PROFESSIONAL DEVELOPMENT (CON'T)

Middle School and High School

Findings:

1. 100% of high school teachers surveyed reported that the district did not provide adequate professional development opportunities related to mathematics. However, 83% of middle school teachers felt the district did provide adequate professional development opportunities related to mathematics.
2. 58% of middle school teachers and 21% of high school teachers reported they did not have enough training to successfully differentiate math instruction in the classroom.

Further discussion by the MPR team with staff members revealed that many teachers have taken a “general” differentiated instruction course, but these courses have not been math-specific.

5. Of the 372 parent surveys returned, 23 comments expressed concern with the effectiveness and quality of the middle school and high school math teachers.
6. Over the past four years, both the middle school and high school have experienced a large turnover in the math department.

Recommendations:

- a. The Assistant Superintendent should offer district-wide math-specific differentiated instruction training to teachers who teach non-leveled classes.
- b. The building principals and the Special Education Coordinator should schedule time for teachers of students with disabilities and general education teachers to collaborate about lessons, pedagogy, and assessments, to further differentiated instruction in the classroom.
- c. The building principals, the Special Education Coordinator, and the Director of Mathematics should schedule time for teachers of students with disabilities and the math teachers to team-teach classroom lessons.
- d. The Director of Mathematics should coordinate plans with the Special Education Coordinators to provide special education training for math teachers, and general math training for teachers of students with disabilities.
- e. Building principals should provide substitute coverage for teachers to visit other classrooms to observe and share best practices in mathematics.

MATH PROGRAM REVIEW

Report to the School Committee

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PROFESSIONAL DEVELOPMENT (CON'T)

- f. Building principals, the Assistant Superintendent, the math department, and the Director of Mathematics should coordinate planning so that teams of math teachers can visit math classes in other districts to observe best-practices.
- g. Members of the math department should create teacher-learning teams in mathematics that begin during the summer and continue throughout the school year. These teams of teachers will investigate topics in mathematics and discuss best practices.
- h. The Assistant Superintendent should work with the professional development facilitators at the elementary, middle, and high school levels to provide professional development courses focusing on:
 - integrating a specific form of technology into the math classroom
 - advanced mathematics topics (for enrichment purposes)
 - developing alternative assessments
 - classroom pedagogy
- i. Consistent with the district's Five Year Professional Development Plan, the district should continue to offer the Studying the Skillful Teacher course, in order help teachers improve instructional strategies.
- j. Building principals and the Director of Mathematics should work together with teachers to schedule common planning time to improve instructional strategies, curriculum coverage, etc.
- k. The district and the School Committee should redouble its efforts to hire and retain highly qualified and experienced teachers by heightening its dedication to improve teacher salaries, reduce student - teacher ratios, and improve working conditions (physical plant, access to technology, adequate supplies, etc.).
- l. The Director of Mathematics should meet with the high school and middle school building principals to discuss the criteria for attracting, hiring, and retaining highly qualified math teachers. They should develop and implement a plan of action.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENT PLACEMENT/LEVELING

Elementary

Students are not generally leveled in the elementary grades K–5. It is noted that through the open response section of the survey, a few parents expressed a desire to have students placed “according to aptitude.” This comment and other related comments are addressed under the “Students with Advanced Skills in Mathematics” section of this report.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENT PLACEMENT/LEVELING (CON'T)

Middle School and High School

Findings:

Overview

1. 58% of teachers believe that math level placement should occur by the seventh grade; 30% agree that leveling should be established in the sixth grade.
2. 75% of middle school parents indicated that they were satisfied with their child's math placement recommendations; 14% disagreed and 11% were neutral.

89% of high school parents indicated that they were satisfied with their child's math placement recommendations; 6% disagreed and 5% were neutral.

Perceptions of Skill Level

3. 72% of sixth and eighth graders felt their skills matched their level of math, compared to 60% of seventh graders.

50% of high school students felt their skills matched their level of math; 25% disagreed and 25% were neutral.

4. 50% of middle school teachers reported that their students were not prepared in the beginning of the year, as compared to 11% of high school teachers.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENT PLACEMENT/LEVELING (CON'T)

Overrides

5. 24 of the 112 high school parents and 18 of the 118 middle school parents who responded to the survey reported requesting an override of their child's math placement. 59% of these requests occurred in the seventh grade and 35% occurred in the eighth grade.
6. The high school override process begins with teachers recommending student placement for the following year, based on course prerequisites. Students and parents who disagree with the placement are asked to complete a form to request an appeal. The Director of Math reviews the appeal in consultation with the teacher(s) and reviews the student's past performance; a decision granting or denying the appeal is made. In the past, some parents have subsequently met with the Director of Mathematics and/or the principal to review an unfavorable decision.
7. Override Data: At the high school level, a total of 171 appeals from students/parents to have the student placed be in a different math course were requested through the override process over the past two years (evenly split each year). Details on these appeals are as follows:

2003–2004 school year:

- 85 appeals total; 72 granted, 13 denied (68 through director, 4 through the principal)
- Of the 72 granted appeals, 59 students remained in the courses and 10 students dropped/transferred to a less-challenging course. Three students transferred to other schools.
- Final grade distribution for students who remained in the courses were: (20) B; (31) C; (3) D; (1) F; (2) Incomplete; (1) Withdraw Pass; (1) Withdraw Fail
- Final grade distribution for the 13 students denied overrides were: (4) A; (7) B; (2) C.
- 13 students were granted overrides from a C1 course to an Honors/AP level course. Summer work was recommended/required. Seven students were approved for Algebra II Trig Honors from Geometry (C1). Two of these students later dropped back down to the C1-level course. Three students were approved for Honors Geometry from Algebra I (C1); one student was approved for Math Analysis Honors from Algebra II Trig and C1. Two students were approved for Calculus AB from Advanced Math Topics I (a junior level C1 course).
- One student completed an Independent Study in Math.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENT PLACEMENT/LEVELING (CON'T)

Override Data (con't)

2004–2005 school year:

- 86 appeals total; 66 granted total (52 through Director, 14 through principal)
 - Of the 66 granted appeals, 48 remain in the courses and 18 dropped the courses.
 - First semester grade distributions for students who remained in the courses were: (5) A; (29) B; (10) C; (2) D; (2) Incomplete.
 - First semester grade distribution of 14 students whose appeals were granted by the principal were: (3) B; (7) C; (1) D; (3) dropped to C1 course.
 - Four students who were denied an override are currently enrolled in the higher-level course. It is unclear how they became enrolled in these classes. First semester grade distributions for these students are B-, C, C+ and D+.
 - Three students received special permission to complete summer work and enroll in the BC Calculus course (2) and the Math Analysis course (1).
 - 16 students were granted overrides into higher-level C1 classes or Honors/AP classes. Two students were approved for Geometry instead of Algebra I (C1); four students were approved for Honors Geometry from Algebra I (C1); three additional students were approved for Honors Geometry but have subsequently dropped to Geometry (C1) during the year; six students were approved for Algebra II/Trig. Honors from Geometry (C1) and five of those students have subsequently dropped back to Algebra II/Trig. (C1). One student was approved for Calculus AB (principal's decision) from Advanced Math Topics I (C1).
 - Four students have moved up from Algebra IA (C2) to Algebra I (C1) and one student has moved up from Geometry (C1) to Honors Geometry during the school year, after consultation with the Math Director and other Administrators.
8. 49 students transferred/dropped a level during the 2003–2004 school year:
- 25 students dropped from Honors/AP courses to a C1 level course; two students changed from BC Calculus to AB Calculus; seven students changed from C1 courses to less challenging C1 courses. Five students dropped from a C1 level to a C2 level and ten students dropped math during the year.
9. Three responses from the parent survey indicated dissatisfaction with the appeals process and the student placement policy.

MATH PROGRAM REVIEW

Report to the School Committee

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STUDENT PLACEMENT/LEVELING (CON'T)

Class Size

10. Teachers at Ambrose (23%), Lincoln (79%), McCall (58%), and WHS (21%) indicated that the physical size of their classrooms (for the 2003–2004 school year) was not adequate for the number of students in the classroom.

However, due to the increased 2004–2005 enrollment, high school math teachers more recently reported that at least three math classrooms are inadequate in size to accommodate class sizes larger than 25 students. Therefore, math teachers need to shuffle classrooms during certain blocks to accommodate teachers who need larger classrooms. The displaced teachers need be “portable,” carrying all of their class work, lesson plans, grading etc. from room to room.

11. Reflecting on 2003–2004 class sizes, 42% of middle school teachers agreed that there were an adequate number of sections at each level to accommodate the students in the system. At the high school level, 81% of high school teachers felt there were adequate sections at each level.
12. Historically, the math department has committed to keeping high school C2 class sizes smaller than the average, in order to better meet the needs of the students (many of whom are on IEP/504 plans). Increased enrollment has posed challenges to this, as staffing has remained virtually unchanged.
13. 21% of WHS students reported that teachers “frequently” helped them at their desks; 57% said “sometimes” and 22% said “never.”

Recommendations:

Perceptions of Skill Level

- a. Each fall, teachers should meet vertically (by different grade level) to discuss the skill level of the incoming students.
- b. Sixth grade math teachers should be included in the Everyday Math orientation at the beginning of the year to aid in student transition.
- c. Teachers should investigate why 25% of high school students felt that their skills did not match their math level.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENT PLACEMENT/LEVELING (CON'T)

Overrides

- d. The placement process should be clearly communicated to parents and students, so that it best serves the needs of the students.
- e. The override procedure should be refined and more clearly communicated so that it will be understood by teachers, parents, and students. This override policy should be consistent with the school-wide procedures that currently are being developed at the high school. This policy should be supported, communicated, and applied consistently by teachers, counselors, the Director of Mathematics, and the building principal.
- f. Prior to finalizing student course changes, the guidance department should communicate with the math department to ensure correct student placement.

Class Size

- g. A high school study group should be established to recommend appropriate class sizes for C1, C2, and Honors-level classes, to ensure effective learning and instruction.
- h. The physical classroom space in the high school and middle school math departments should be re-evaluated and adjusted to accommodate increasing class sizes.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENTS WITH DISABILITIES

District-wide

Findings:

Content/Curriculum and Classroom Practices

1. Of the 78 parents of students with IEPs who responded to the survey question regarding their child's understanding of concepts in class, 33% indicated that their child consistently did not understand the mathematical concepts/topics taught in class; 49% agreed that their child did understand, and 18% were neutral.
2. Of the 78 parents who responded to the survey question regarding IEP/504 compliance, 64% felt their child's teacher was complying with the prescribed accommodations in their child's IEP/504. Twelve of the 78 felt that the teacher was not complying with the prescribed accommodations, and 16 parents were neutral.
3. C.A.S.T. members reported that teachers of students with disabilities have expressed a desire to be included in regular education meetings, in order to collaborate on curriculum and to share best practices.

Effective Communication

4. Of the 80 parents of students with IEPs who responded to survey questions regarding teacher accessibility and responsiveness, 75% felt teachers were accessible and responsive when they had questions regarding their child and his/her class; 18% were neutral and 7% disagreed.
5. Of the 77 parents of students with IEPs who responded to the survey question regarding their child's teachers working together, 53% agreed that their child's math teacher and the special education team worked together to meet their child's needs.

17% of the parents of students with IEPs disagreed that the teachers worked together. These parents were primarily split evenly among the high school and middle school respondents.
6. Scheduled time for collaboration between general education and teachers of students with disabilities is limited. See Finding #3 under the "Effective Communication" section of this report for further details and recommendations.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENTS WITH DISABILITIES (CON'T)

Recommendations:

Content/Curriculum and Classroom Practices

- a. The teacher – student ratio must be maintained at a level that allows students of all abilities to successfully access the curriculum being taught.
- b. The building principal, Director of Mathematics, and the Elementary Math Coordinator should ensure that teachers and instructors of students with disabilities are available to provide instructional support to students in the math classrooms and in the learning centers on a regular basis.
- c. Classroom teachers should check for student understanding of expectations and/or directions on homework before students leave the room. This should be addressed at grade level/department meetings.
- d. In the fall, building principals, the Elementary Math Coordinator, the Director of Mathematics, Special Education Coordinators, and Guidance Counselors should work with teachers to ensure compliance with IEP and 504 plans.

Effective Communication

- e. Teachers of students with disabilities and general education teachers should meet together at district, grade-level, building-based, and faculty meetings in order to further communication and to collaboratively design lesson plans that meet the math needs of students with disabilities in the classroom.
- f. The district should research exemplary special education models in other districts that appropriately address the needs of students with disabilities.
- g. The Director of Mathematics and the Elementary Math Coordinator should coordinate plans with the Special Education Coordinators to provide special education training for math teachers, as well as regular math training for teachers of students with disabilities.
- h. The Director of Mathematics, the Elementary Math Coordinator, and the Special Education Coordinators should provide training for implementing best practices in co-teaching environments.
- i. In addition to the recommendations outlined above, please see the recommendation in the Effective Communication section regarding structured teacher collaboration time.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENTS WITH DISABILITIES (CON'T)

Elementary (Everyday Math-specific)

Findings:

1. On the 2004 fourth grade math MCAS exam, there were only four questions on which 20% or more of students with disabilities scored below the state proficient score. On all other questions, students with disabilities scored at or above state proficiency levels.
2. The percentage of elementary students with disabilities at each school for the 2003–2004 school year is as follows:
 - Lynch, 21.3%
 - Muraco, 10.9%
 - Lincoln, 10.5%
 - Ambrose, 8.0%
 - Vinson-Owen, 7.7%
3. Discussions during C.A.S.T. meetings indicated that teachers of students with disabilities have expressed a need to further understand the Everyday Math program.
4. Through the open response section of the parent survey, three parent comments indicated that Everyday Math poses unique challenges for students who struggle with reading, or vocabulary, or who have language-based learning disabilities.
5. There currently are no guidelines for determining the appropriate math program and level of instruction for students in the K–1, Primary, and Intermediate learning centers (currently located in the Lynch School).

Recommendations

Elementary

- a. The district should include teachers of students with disabilities in the formal Everyday Math training so that they fully understand the mathematics program they are teaching.
- b. The Elementary Math Coordinator, the building principal, the Director of Student Services, the Special Education Coordinators, and the Assistant Superintendent should work together with staff to identify and establish guidelines for determining the appropriate math curriculum and instruction for the unique needs of students in the K–1, Primary, and Intermediate Learning Centers (currently located at the Lynch school). This will address what program each student should be using, and at what level.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENTS WITH DISABILITIES (CON'T)

Middle School/High School

Findings:

1. Of the 21 parents of students with IEPs who responded to the survey question regarding high school math offerings, 24% disagreed that the math department offered courses that met their child's interests/needs/abilities; 62% agreed that it did and 14% were neutral.
2. 44% of middle school parents and 25% of high school parents agreed that their child's math teachers and special education team worked together to meet their child's needs.

Recommendations:

- a. The course offerings at the high school should be examined and updated where necessary to ensure that students with disabilities have the opportunity to take appropriate courses throughout their high school careers.
- b. The Director of Mathematics and the Special Education Coordinators should investigate parental concerns regarding collaboration between math teachers and teachers of students with disabilities.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENTS WITH ADVANCED SKILLS IN MATHEMATICS

Elementary (Everyday Math-specific)

Findings:

1. In response to what would make their math journal more helpful, 15% of elementary students reported “harder/more challenging.”
2. 53% of elementary students agreed that math was “easy;” 27% indicated it was “hard,” and the remainder had a neutral opinion.
3. Five comments shared by elementary parents on the open response section of the survey indicated that the Everyday Math program was not challenging to some students. Terms used by parents included: “repetitive,” “overly-simplistic,” “fails to challenge,” “no opportunity to work ahead,” “more dynamic curriculum” and a “less boring curriculum.” Two comments suggested placing children according to aptitude.
4. When asked what changes would bring the greatest improvement to the mathematics curriculum, 19% of elementary parents requested “more math enrichment opportunities for advanced/gifted kids” and 2% requested “more challenging/higher standards.”
5. C.A.S.T. members reported that teachers have requested additional training and enrichment activities from the Everyday Math publishers in order to better meet the needs of students who are advanced in mathematics. However, the publishers have told C.A.S.T. members that additional enrichment materials are not necessary if the program is fully implemented.

Recommendations:

- a. An Elementary Mathematics Coordinator should be hired to research and provide enrichment activities that support the Everyday Math program.
- b. With the assistance of the Elementary Math Coordinator:
 - a study group will be formed to research exemplary enrichment activities used by other districts to support the Everyday Math program;
 - the study group will focus on developing enrichment activities that can be used in Winchester’s grades K–5; and
 - time and financial resources will be provided to support implementation of these enrichment activities for advanced students.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

STUDENTS WITH ADVANCED SKILLS IN MATHEMATICS (CON'T)

Middle School and High School

Findings:

1. The following is a list of competitive (optional, extra-curricular) exams that McCall offers its students during the year:
 - a. American Mathematics Competition 8
 - b. American Mathematics Competition 10
 - c. Math Counts (three tests per year)
 - d. New England Math League
2. The middle school math team practices weekly for one hour and competes in five meets per year.
3. The following is a list of competitive (optional, extra-curricular) exams that WHS offers to its students during the school year:
 - a. New England Math League Exams (six per year)
 - b. Massachusetts Mathematics Olympiad
 - c. American Mathematics Competitions
 - d. American Invitational Mathematics Examination
 - e. Continental Calculus Mathematics League (four per year)
4. Advanced Placement Statistics was added to the high school curriculum for the 2005–2006 school year.
5. 40% of middle school students and 35% of high school students agreed with the statement: “I like to challenge myself and attempt higher level math problems.”
6. Five comments shared by middle school and/or high school parents on the open response section of the survey indicated that they would like to see more challenging opportunities for their students.

Recommendations:

- a. The Math Department should assess the level of student interest in extra-curricular enrichment activities that would challenge students who have advanced skills in mathematics.
- b. The Math Department should develop ways to encourage more student participation in extra-curricular enrichment activities.
- c. Teacher teams should be created to develop enrichment activities for the classroom to support students with advanced skills in mathematics.
- d. The district should provide resources to support those enrichment activities.

MATH PROGRAM REVIEW

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EFFECTIVE COMMUNICATION

Elementary (Everyday Math-specific)

Findings:

Teacher Accessibility and Responsiveness

1. 87% of elementary parents felt that teachers were accessible when they had questions regarding their child's math program.
2. 85% of elementary parents felt that teachers were responsive when they had questions about their child's math program.
3. 85% of elementary teachers felt that they could effectively explain the Everyday Math program to parents. 7% of Lincoln, 15% of Lynch, and 13% of Vinson-Owen teachers indicated that they did not feel able to effectively explain the Everyday Math Program to parents.

Printed Home-School Communications

4. 85% of elementary parents read the Everyday Math "Family Letters" that are sent home at the beginning of every mathematics unit. 68% of these parents reported that the letters are useful. These Family Letters are standardized letters produced by the publishers of Everyday Math.
5. 14% of elementary students reported that they do not bring the Family Letters home to their parents; 19% reported that they "don't know" if they bring the letters home.

Program Awareness

6. 45% of elementary parents agreed that the mathematics program prepared their children for success on state and other standardized assessments, another 50% reported a neutral opinion and 5% disagreed. Yet, Winchester's district-wide MCAS scores ranked second in the state in 2004, and fifth in the state in 2003. (Students in grade four are the only elementary students who take MCAS mathematics exam.)

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

EFFECTIVE COMMUNICATION (CON'T)

Recommendations:

Teacher Accessibility and Responsiveness

- a. To further enhance parents' already high perception of teachers' responsiveness and accessibility, and to provide them with as much information as possible about their child's progress, continue to send all grade 1–5 unit and mid-year assessments home.
- b. The Assistant Superintendent and the Elementary Math Coordinator should offer additional, ongoing training opportunities for all teachers after the start of the school year. This will ensure that both new and experienced teachers understand the Everyday Math program, answer any questions they may have, and provide suggestions for teaching strategies.

Printed Home-School Communications

- c. The building principal or Elementary Mathematics Coordinator should work with teachers to ensure consistent distribution of the Family Letters to all parents. Parents could be reminded of the letters and encouraged to read them by occasional reminders in the school newsletters.
- d. At curriculum nights/open houses, Grade 1–5 teachers should highlight the value of parent letters that introduce vocabulary, algorithms, games, and homework answers associated with each unit.
- e. Teachers should distribute all parent communications from the Everyday Math program consistently. Principals should address the value of parent communications during faculty or building based meetings.

Program Awareness

- f. Further communication is needed to enhance awareness and appreciation for the value and success of the Everyday Math program. This can be done through:
 - Explaining the program at open houses and parent conferences
 - Publishing MCAS results through the District Report card via the Web site
 - Hosting an annual Math Morning for families to explore math activities with their children.
- g. Elementary teachers of grades 1–5 should forward end-of-the-year assessments to the next year's teacher, to encourage communication across grade-levels with regard to students' abilities.

MATH PROGRAM REVIEW

Report to the School Committee

May 24, 2005

EFFECTIVE COMMUNICATION (CON'T)

Middle School and High School

Findings:

1. 92% of middle school and 82% of high school math teachers reported that they regularly talk with each other about their teaching.
2. 100% of teachers at both the middle school and high school agreed that they valued collaboration between teachers on curriculum and pedagogy.
3. 93% of high school teachers and 58% of middle school teachers indicated that there are no formalized structures in place to facilitate teacher collaboration on curriculum.
4. 10% of middle school and 12% of high school parents disagreed with the statement “my child’s teacher is accessible when I have questions about my child and his/her math.”
5. 9% of middle school and 13% of high school parents disagreed with the statement “my child’s teacher is responsive when I have questions about my child and his/her math.”

Recommendations:

- a. The Director of Mathematics, building principals, and the Assistant Superintendent should coordinate plans to create time for teacher collaboration on curriculum and pedagogy.
- b. Teachers should continue to respond to parent inquiries via email and/or follow-up phone calls in a timely manner.
- c. Teachers should continue to send home progress reports as necessary/requested.
- d. The Director of Mathematics and teachers should utilize department meeting time to review the topics outlined below and further discuss how to communicate these topics consistently with parents:
 - Course expectations
 - Extra help availability
 - Course curriculum
 - Grading guidelines
 - Homework

MATH PROGRAM REVIEW

Report to the School Committee

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TECHNOLOGY

District-wide

Findings:

1. When asked whether they had adequate access to needed technology, 65% of teachers district-wide disagreed. The highest lack of access was reported among Muraco teachers* (91%) and high school teachers (72%). Teachers of the other four elementary schools reported lack of access ranging from 50%–60%, and middle school teachers reported 56%.

Based on teacher comments and interviews, reasons for lack of access at the high school were inadequate number of computers in labs, non-functioning computers in classrooms/labs, and a limited number of computer labs.

Based on teacher comments and interviews, reasons for lack of access at the middle school were inadequate number of computer labs and inability to use a computer lab without an Integration Technology Specialist (“ITS”) specialist.

** Please note: In June 2004, Muraco parents raised nearly \$30,000 to replace ten-year-old Macintosh computers at the Muraco school. The parents then worked with the technology department over the summer break to have the refurbished computers up and running. Muraco staff now use the computers for math education through several programs, including APlusMath.com and Multiplication.com. Muraco staff are pleased and appreciative of the parents’ successful efforts.*

2. 77% of teachers district-wide agreed that they would use technology more in their teaching if it were available. Agreement was strongest among high school teachers, with 93% strongly agreeing and 0% disagreeing; 7% were neutral. 73% of elementary and 66% of middle school teachers agreed.
3. When asked what three changes would bring the greatest improvement to teaching mathematics in Winchester, “more/better technology” was the number one choice of high school (70%) and middle school teachers (33%), and the number two choice of elementary teachers (27%).
4. The high school math department has only three TI83 overhead graphing calculators and one LCD projector to share among nine teachers.

MATH PROGRAM REVIEW

Report to the School Committee

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TECHNOLOGY (CON'T)

Recommendations:

District

- a. The Technology Department should provide ongoing technology integration training to classroom teachers throughout the year. These courses should be tailored to meet the specific, unique needs of teachers at the three levels (elementary, middle school, high school). Currently, the “Unlocking the Possibilities” course offered by the Educational Technology department twice each summer is both popular with, and effective for, teachers. Excerpts from this course could be offered during the year, or the entire course could be offered during the fall or spring semesters in addition to the two summer sessions.
- b. The district should provide more technology-based workshops and courses that have a focus on mathematics education.
- c. The district should offer brief workshops on specific software programs on release days/professional days/summer sessions.

Elementary

- d. The district should ensure equal distribution of technology in all elementary schools.
- e. The Everyday Math program should be supported with appropriate software recommended by the Integration Technology Specialist (ITS).
- f. Teachers should investigate and, if worthwhile, purchase the Everyday Math Game’s software.
- g. The district should increase time with ITS to plan and implement math lessons.

Middle School

- h. Teachers should coordinate schedules with the technology department so that math teachers have greater access in order to fully utilize the technology labs. Middle School math teachers should be allowed to independently access the computer lab with their students.
- i. The Technology Director and Math Director should create opportunities for the math teachers and technology teachers to update and expand math software.
- j. The Technology Department should train classroom teachers to effectively integrate technology into the math program.

MATH PROGRAM REVIEW

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TECHNOLOGY (CON'T)

High School

- k. The district should add computers to the computer labs to accommodate full class sizes.

- l. The district should provide LCD projectors and computers in each of the math classrooms.

- m. The district should provide each math classroom with an overhead graphing calculator.

- n. The Math Director and math teachers should investigate a means of ensuring TI83+ calculators are available to all students in Algebra 2 and higher level courses and scientific calculators are available to all students in C2-level courses.

- o. The Technology Director and Math Director should create opportunities for the math teachers and technology teachers to update and expand math software.

- p. The Technology Department and the Math Departments should work together to train classroom teachers to effectively integrate technology into the math program.

MATH PROGRAM REVIEW

Report to the School Committee

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SUPPLIES/RESOURCES

Findings:

Overview

1. 32% of teachers district-wide reported that they did not have the appropriate materials, supplies, and manipulatives needed to teach their classes; 58% reported that they did and 10% were neutral.

Elementary (Everyday Math-specific)

2. Among the elementary schools, an average of 25% of teachers indicated they did not have the supplies needed to teach the Everyday Math program. Lack of supplies was indicated to be strongest at Muraco (46%) and Vinson-Owen (40%).

88% of Ambrose, 71% of Lincoln, and 77% of Lynch teachers indicated that they did have the supplies needed to teach the Everyday Math program.

Middle School

3. 83% of McCall teachers indicated that they have appropriate supplies to teach their classes.

High School

4. 57% of high school teachers reported that they did not have the appropriate materials, supplies, and manipulatives needed to teach their classes, while 32% reported that they did and 11% were neutral.

Recommendations:

Elementary

- a. Teachers should annually identify and compile lists of missing and needed math materials, beginning with the FY06 school year. These lists should be forwarded to the Elementary Math Coordinator or the Assistant Superintendent.
- b. The district should supply every classroom teacher with the materials needed to effectively implement the Everyday Math program.

Middle School and High School

- c. Teachers should annually identify and compile lists of missing and needed math materials, beginning with the FY06 school year. These lists should be forwarded to the Math Director.
- d. The district should supply every classroom teacher with the materials needed to effectively implement the course curriculum.

MATH PROGRAM REVIEW

Report to the School Committee

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FUTURE REVIEW MODEL

The following is recommended as the district reviews other areas of the curriculum:

Getting Started:

- Identify curriculum area to review, according to the district's master schedule.
- Seek input from the administration and school committee regarding expectations of the review.
- Develop clear timelines for starting and completing the program review.
- Recruit team members to include teachers from every school, administrators, and a member of the community at-large.
- Develop team meeting schedule.
- Communicate team member time commitment.

Planning for Data Collection:

- Provide opportunities for collaboration and discussion among all team members from K–12 levels. Take meeting minutes and distribute to all members in a timely manner.
- Review the district's strategic plans prior to beginning curriculum review.
- Select clear goals, develop inquiry questions, and pinpoint areas of concern or study before developing focus interview or survey questions.
- Carefully construct focus interview and survey questions to elicit responses that directly address goals, inquiry questions, and areas of concern.
- Do not include a "neutral" response option.
- Design student surveys appropriate to each level: primary, intermediate, middle school, and high school.
- Include all grades (K–12) in the student surveys.
- Obtain surveys from all teachers (K–12) of the subject area under review.

Analyzing Data and Reporting Results:

- Provide analysis company/committee with clear instruction for reporting data results to the review team.
- Develop an effective and efficient process for reviewing and analyzing data results in such a way that the resulting recommendations address the findings in the report.
- Establish a format for reporting findings and recommendations resulting from data analysis.
- Present the preliminary report to faculty and administration for feedback.
- Present the preliminary report to a subcommittee of the School Committee and the Superintendent for feedback.
- Present the final report to the School Committee at a public session.

MATH PROGRAM REVIEW

Report to the School Committee

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CONCLUSION

The focus of the Math Program Review was to evaluate the effectiveness of the math curriculum and its delivery, to develop recommendations for improvement where necessary, and to create a model for future reviews. A number of diverse data collection methods were utilized to ensure adequate coverage of the population affected by the Winchester Public Schools math program. Findings and recommendations made in this report were based both on feedback provided by parents, students, and teachers, and on objective standardized assessments and reports.

The math program has proven to be exceptional in providing the children of Winchester with an outstanding math experience. This is evidenced both objectively by assessments and MCAS scores, and subjectively by survey results and feedback. However, further examination of the curriculum and instruction provided to certain subgroups of the population—7th graders, students with disabilities, and students with advanced skills in mathematics—is necessary, to ensure that the needs of all students in the district are being addressed. There is a need for formalized teacher collaboration in order to ensure consistency within grade levels and/or courses, as well as more math-specific professional development

Teacher support for the current math program is strong. Professional development and collaboration opportunities are valued, appreciated, and requested. Consistent maintenance and replenishment of supplies, expanded access to technology, and adequate classroom facilities were indicated to be essential to instruction.

Teacher accessibility/responsiveness and home-school communication regarding course expectations, extra-help availability, course curriculum, grading guidelines, and homework were noted to be important to the success of the math program.

This review of the math curriculum revealed the current successes of the district's math curriculum, as well as existing needs and areas of concern. Recognizing the district's commitment to excellence in mathematics, the MPR team has respectfully submitted this report.

MATH PROGRAM REVIEW

Report to the School Committee

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APPENDIX 1: 2004 Middle School MCAS Scores

EDCO DISTRICTS

Rank	Town	Grade 6		Grade 8		TOTAL
		% Advanced	% Proficient and Above	% Advanced	% Proficient and above	
1	Acton-Boxborough	56	84	45	81	266
12	Arlington	23	59	23	55	160
11	Bedford	36	69	28	64	197
8	Belmont	36	76	34	73	219
10	Brookline	35	71	29	67	202
6	Concord-Carlisle	33	71	43	80	227
3	Lexington	52	78	44	76	250
9	Lincoln-Sudbury	33	68	39	74	214
7	Newton	38	70	40	74	222
14	Waltham	15	37	10	35	97
13	Watertown	16	46	18	49	129
4	Wayland	52	76	42	78	248
5	Weston	45	70	47	75	237
2	Winchester	58	85	36	73	252

NEIGHBORING DISTRICTS

Rank	Town	Grade 6		Grade 8		TOTAL
		% Advanced	% Proficient and Above	% Advanced	% Proficient and above	
3	Arlington	23	59	23	55	160
2	Lexington	52	78	44	76	250
7	Medford	11	35	10	36	92
5	Melrose	21	48	10	40	119
6	Stoneham	14	44	12	46	116
1	Winchester	58	85	36	73	252
4	Woburn	26	61	13	38	138

MATH PROGRAM REVIEW

Report to the School Committee

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APPENDIX 2: 2004 High School MCAS Scores

EDCO DISTRICTS

Rank	Town	Grade 10		TOTAL
		% Advanced	% Proficient and above	
1	Acton-Boxborough	69	90	159
13	Arlington	45	69	114
10	Bedford	55	80	135
10	Belmont	55	80	135
12	Brookline	52	78	130
4	Concord-Carlisle	67	86	153
8	Lexington	61	81	142
7	Lincoln-Sudbury	60	85	145
9	Newton North	58	82	140
6	Newton South	62	86	148
15	Waltham	25	57	82
14	Watertown	36	67	103
2	Wayland	66	88	154
5	Weston	65	85	150
2	Winchester	69	85	154

NEIGHBORING DISTRICTS

Rank	Town	Grade 10		TOTAL
		% Advanced	% Proficient and above	
3	Arlington	45	69	114
2	Lexington	61	81	142
5	Medford	34	64	98
6	Melrose	32	63	95
4	Stoneham	37	75	112
1	Winchester	69	85	154
7	Woburn	29	64	93

MATH PROGRAM REVIEW

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APPENDIX 3: 2003 Math SAT I scores*

EDCO DISTRICTS

Rank	Town	Average SAT I Score
4	Acton-Boxborough	603
13	Arlington	535
11	Bedford	584
8	Belmont	594
7	Brookline	595
5	Concord-Carlisle	599
5	Lexington	599
9	Lincoln-Sudbury	593
3	Newton North	612
1	Newton South	617
15	Waltham	479
14	Watertown	525
10	Wayland	591
2	Weston	616
12	Winchester	579

NEIGHBORING DISTRICTS

Rank	Town	Average SAT I Score
3	Arlington	535
1	Lexington	599
6	Medford	477
4	Melrose	518
7	Stoneham	475
2	Winchester	576
5	Woburn	514

*These scores come from *Boston Magazine* (9/04).