

HIGHLIGHTS OF MATHEMATICS CURRICULUM SURVEY

Newton, MA Public Schools

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Prepared by Ann Brackett, Director, Research and Evaluation
Sue Henderson, Senior Research Associate
Nancy Hurley, Associate in Research and Evaluation
Learning Innovations at WestEd

BACKGROUND OF RESPONDENTS

Teachers

- A total of 192 teachers responded to the online questionnaires, with 42% from elementary schools, 42% from middle schools, and just under 17% from the high schools.
- Thirteen percent of the elementary and high school teachers responding were in their first two years of teaching, with the remaining teachers experienced across a range of three to more than 30 years.
- Distribution of teachers across grades (within each level) was fairly even.

Administrators

- A total of 36 administrators responded. Thirty-one percent are principals; 25% Assistant Principals or Housemasters; with 44% serving in district-wide positions.
- 38% of the administrators indicated that they work at the elementary level, 42% at middle school level, and 31% at high school level (with some, most likely at the district level, responding that they work at more than one level).
- Six percent of the administrators are within their first two years as an administrator. Fifty percent have been in administration for 16 or more years.
- Thirty-one percent of administrators who responded are principals; 25% Assistant Principals or Housemasters; with 44% serving in district-wide positions.

Students

- A total of 3010 students responded to the questionnaires, with 19% from elementary schools (grades 4 and 5 only), 67% from middle schools, and 14% from the high schools.
- Gender breakdowns at each level were approximately 50%.
- Ethnicity breakdowns at each level were consistent.
- Around 70% or more had attended Newton Public Schools continuously since kindergarten. Five percent of the students at each level had started in the NPS this year.
- Eighty-seven percent of Middle School students and 95% of High School students indicated that their parents expect them to attend a four-year college or graduate school.

Parents

- A total of 384 parents responded, with 45% responding about their child in elementary school, 45% middle school, and 10% high school. Responses were fairly evenly distributed across grade levels within each level.

- Seventy-nine percent of middle school parents and 70% of high school parents indicated that their children had attended Newton Public Schools continuously since kindergarten.

MATHEMATICS STANDARDS

- 40% of elementary teacher (E), 56% of middle school teachers (M), and 75% of high school teachers (H) indicated strong familiarity with NCTM standards.
- 86% E, 70% M, and 34% H teachers indicated strong *familiarity* with Newton Mathematics Benchmarks.
- 71% E, 73% M, and 31% H teachers indicated *agreement* with Newton Mathematics Benchmarks.

MATHEMATICS CONTENT STUDENT LEARNING GOALS

- When asked how strong an emphasis they put on a range of student learning goals,
 - 95%E, 100%M, and 94%H teachers indicated *learn concept*.
 - 90%E, 97%M, and 97%H teachers indicated *problem solving*.
 - 88%E, 93%M, and 100%H teachers indicated *reasoning*.
 - 35%E, 60%M, and 59%H teachers indicated *prepare for MCAS and other tests*.

MATHEMATICS CURRICULUM

Teachers indicated the extent of their satisfaction with many aspects of the curricula they teach. The following points refer to the percent of teachers using each curriculum who indicated strong satisfaction (4 or 5 on a 5-point scale) with the given aspect.

- *Textbook or curriculum as a whole*
 - 38% of E teachers using Everyday Math
 - 83% of E teachers and 50% of M teachers using Connected Math
 - 40% of M teachers using Gateways
 - 38% of M teachers using McDougall-Little
- *Sequence of topics*
 - 27% of E teachers using Everyday Math
 - 83% of E teachers and 42% of M teachers using Connected Math
 - 20% of M teachers using Gateways
 - 63% of M teachers using McDougall-Little
- *Coverage of topics*
 - 37% of E teachers using Everyday Math
 - 67% of E teachers and 33% of M teachers using Connected Math
 - 30% of M teachers using Gateways
 - 75% of M teachers using McDougall-Little

- *Provides for inquiry-based investigations*
 - 29% of E teachers using Everyday Math
 - 72% of E teachers and 67% of M teachers using Connected Math
 - 30% of M teachers using Gateways
 - 0% of M teachers using McDougall-Little
- *Provides relevance to day-to-day experiences*
 - 50% of E teachers using Everyday Math
 - 78% of E teachers and 58% of M teachers using Connected Math
 - 0% of M teachers using Gateways
 - 0% of M teachers using McDougall-Little
- All of these curricula gained under 40% satisfaction from teachers in the following areas:
 - *Considers different learning styles*
 - *Allows access for all students*
 - *Reflects diversity of our society* (except 44% of the elementary teachers who use Connected Math)
- Everyday Math gained under 50% satisfaction from teachers except in the following areas:
 - 55% for *Involves use of manipulatives*
 - 50% for *Encourages collaboration*
 - 50% for *Provides relevance to day-to-day experiences*
 - 50% for *Involves students in active learning*
- Connected Math drew different levels of satisfaction from elementary and middle school teachers
- Connected Math gained under 50% satisfaction from both groups in the following areas:
 - 33% of E teachers and 25% of M teachers for *Considers different learning styles*
 - 28% of E teachers and 0% of M teachers for *Allows access for all students*
 - 44% of E teachers and 17% of M teachers for *Reflects diversity of our society*
 - 17% of both groups for *Provides for diverse cultural backgrounds, abilities, and learning styles*
- Gateways gained under 50% satisfaction in all categories, except 60% for *Emphasizes connections between strands of mathematics*
- McDougall-Little gained under 50% satisfaction in all categories, except for *Sequence of topics* and *Coverage of topics* as shown above.

- High School Curricula
 - *Texts/Materials appropriate for the course*: 79% Honors, 69% 1A, 57% SIMMS, 52% 1B, 39% 2
 - *Curriculum challenges students*: 89% Honors, 81% 1A, 50% SIMMS, 70% 1B, 52% 2
 - *Involves students in active learning*: 68% Honors, 65% 1A, 57% SIMMS, 65% 1B, 30% 2
 - Honors: All categories above 50% satisfaction except *Emphasizes interdisciplinary connections* (16%). The highest satisfaction level in any category was 89%.
 - 1A: 25% of the categories gained satisfaction from less than 50% of the teachers. The highest satisfaction level in any category was 81%.
 - SIMMS: 25% of the categories gained satisfaction from less than 50% of the teachers. The highest satisfaction level in any category was 57% of teachers.
 - 1B: 42% of the categories gained satisfaction from less than 50% of the teachers. The highest satisfaction level in any category was 74% of teachers.
 - 2: 83% of the categories gained satisfaction from less than 50% of the teachers. The highest satisfaction level in any category was 53% of teachers.

- 42% of the administrators expressed satisfaction with the curriculum materials in their schools or the district as a whole. 50% indicated satisfaction with the level of implementation of the curriculum by the majority of teachers.

MATHEMATICS INSTRUCTION

Classroom Activities

Teachers were asked how often they do a number of classroom activities. The activities with the highest percent of teachers who indicated that they do these activities during most or all mathematics lessons (4 or 5 on scale) are:

- E teachers:
 - 89% *Engage the class in whole group discussions*
 - 89% *Require students to explain their responses when giving an answer*
 - 88% *Allow students to work at their own pace.*
- M teachers:
 - 100% *Assign mathematics homework.*
 - 97% *Introduce content through formal presentations.*
 - 93% *Require students to explain their responses when giving an answer.*
- H teachers:
 - 100% *Assign mathematics homework.*
 - 94% *Require students to explain their responses when giving an answer.*
 - 91% *Introduce content through formal presentations.*

Teachers were asked how often students take part in a number of types of classroom activities. The activities with the highest percent of teachers who indicated that they have their students do these activities during most or all mathematics lessons are:

- E teachers say students:
 - 94% *Engage in mathematical activities using concrete materials*
 - 86% *Work in groups*
 - 71% *Answer textbook or worksheet questions*
- M teachers say students:
 - 97% *Answer textbook or worksheet questions*
 - 90% *Use mathematical concepts to solve applied problems*
 - 90% *Review homework/worksheet assignments*
 - 87% *Work in groups*
- H teachers say students:
 - 94% *Listen and take notes during presentation by teacher*
 - 94% *Review homework/worksheet assignments*
 - 91% *Answer textbook or worksheet questions*
 - 78% *Use mathematical concepts to solve applied problems*

Students were asked the same questions and gave the following responses:

- E students say they:
 - 77% *Answer textbook or worksheet questions*
 - 72% *Explain how you solve a problem*
 - 53% *Read the math textbook in class*
- M students say they:
 - 90% *Answer textbook or worksheet questions*
 - 86% *Explain how you solve a problem*
 - 70% *Think about another, alternative way to solve a problem*
- H students say they:
 - 91% *Answer textbook or worksheet questions*
 - 84% *Use a calculator to do homework*
 - 78% *Explain how you solve a problem*

Use of Technology

Teachers were asked how often they use technology with students for mathematics work. The following percents of teachers indicated that students do the following during most or all mathematics lessons:

- *Use calculators during class:* 34% of E teachers, 60% of M teachers, and 97% of H teachers.
- *Allowed to use calculators for homework:* 23% of E teachers, 50% of M teachers, 100% of H teachers.
- *Use computer spreadsheets as part of math instruction:* 3% of E teachers, 0% of M teachers, and 3% of H teachers.

Homework

- E students: 50% do 1-15 minutes of math homework on a typical **day**. 36% do 16-30 minutes a day (According to students)
- 55% of E teachers say they assign 30 minutes or less of math homework per **week**.
- M students: 30% do 60 minutes or less of math homework in a typical **week**. 35% do two hours or more per **week**. (According to students)
- 17% of M teachers say they assign 60 minutes or less of math homework in a typical **week**. 34% say they assign two hours or more per **week**.
- H students: 37% do 60 minutes or less of math homework in a typical **week**. 33% do two hours or more per **week**. (According to students)
- 15% of H teachers say they assign 60 minutes or less of math homework in a typical **week**. 34% say they assign two hours or more per **week**.

MATHEMATICS INSTRUCTION: Classroom Assessment

Teachers were asked to indicate (using a checklist) which methods they use to assess student progress in mathematics. The following percents of teachers indicated that they do the following during most or all mathematics lessons:

- *Observe students and ask questions as they work individually*: 100% of E teachers, 97% of M teachers, and 91% of H teachers.
- *Observe students and ask questions as they work in small groups*: 98% of E teachers, 97% of M teachers, 81% of H teachers.
- *Ask students questions during large group discussions*: 96% of E teachers, 93% of M teachers, and 97% of H teachers.
- *Use assessments embedded in class activities to see if students are “getting It:”* 91% of E teachers, 83% of M teachers, and 69% of H teachers.
- *Review student homework*: 73% of E teachers, 100% of M teachers, and 94% of H teachers.
- *Give tests requiring open-ended responses*: 49% of E teachers, 83% of M teachers, and 88% of H teachers.

STUDENTS’ EXPERIENCE WITH MATHEMATICS

Students were asked how often they do various activities during math lessons. Activities that the largest percents of students indicated they did in most or all lessons include:

- *Answer textbook or worksheet questions*: 77% of E students, 90% of M students, and 91% of H students.
- *Explain how you solve a problem*: 72% of E students, 86% of M students, and 78% of H students.

Students were asked to indicate what their teachers do when the student finishes math work before other students. The most commonly selected activities are:

- *Ask you to work on something else:* 81% of E students, 71% of M students, and 57% of H students.
- *Ask you to help another student:* 57% of E students, 55% of M students, and 52% of H students.

Students were asked to indicate what they do when they don't understand something in mathematics. The most commonly selected activities were the following:

- *Ask another student:* 71% of E students, 82% of M students, and 87% of H students.
- *Ask your teacher a question during math class:* 69% of E students, 72% of M students, and 69% of H students.

Students were asked about their attitudes / experiences in mathematics. The following percents of students indicated agreement with the following statements:

- *I usually do well in math:* 71% of E students, 77% of M students, and 82% of H students.
- *I enjoy doing math in school:* 45% of E students, 50% of M students, and 57% of H students.
- *I need to learn math to get the kind of job I want in the future:* 45% of E students, 58% of M students, and 50% of H students.
- *I feel confident that I can always get the help that I want from my teacher:* 78% of E students, 77% of M students, and 75% of H students.

Parents were also asked about their children's experience with mathematics. The following percents of parents indicated agreement with the following statements:

- *My child enjoys math at school:* 68% of E parents, 63% of M parents, and 48% of H parents.
- *My child's teacher teaches to my child's learning level:* 42% of E parents, 57% of M parents, and 55% of H parents.
- *The way students are grouped for math instruction this year fits my child's learning needs:* 22% of E parents, 53% of M parents, and 50% of H parents.
- *The math content is demanding enough to meet the learning needs of my child:* 39% of E parents, 64% of M parents, and 60% of H parents.
- *My child receives the additional instruction needed from the teacher when s/he doesn't understand something in math:* 48% of E parents, 60% of M parents, and 45% of H parents.
- *If my child already knows something in math or finished his or her assignment before most other students, the teacher gives her or him more challenging work:* 22% of E parents, 14% of M parents, and 8% of H parents.

STUDENTS' LEARNING AND SKILLS (ACCORDING TO PARENTS)

Parents were asked about their children's learning and skills in mathematics. The following percents of parents indicated agreement with the following statements:

- *My child can verbally explain his or her thinking to me:* 80% of E parents, 76% of M parents, and 65% of H parents.
- *My child's computational skills are appropriate for his or her grade level:* 64% of E parents, 75% of M parents, and 88% of H parents.
- *My child knows how to use a calculator as a math tool appropriately:* 55% of E parents, 86% of M parents, and 98% of H parents.

COMMUNICATION WITH PARENTS

Teachers, administrators, and parents were asked about the quality and timeliness of information provided to parents about mathematics in their child's classroom. The following percents of these groups indicated agreement with the following statements:

- *Parents are provided adequate information about what is expected in math in my classroom:* 85% of E teachers, 93% of M teachers, and 91% of H teachers. In response to a similar question about information provided by teachers in their school or the district, 47% of administrators indicated agreement. When parents were asked the same question, 48% of E parents, 43% of M parents, and 35% of H parents agreed that they receive enough information about what is expected in math in their child's classroom.
- *Parents are provided the information on their child's progress in a timely fashion:* 83% of E teachers, 83% of M teachers, and 78% of H teachers. In response to a similar question about information provided by teachers in their school or the district, 34% of administrators indicated agreement. When parents were asked the same question, 49% of E parents, 55% of M parents, and 43% of H parents agreed that they receive enough information about their child's progress in math.

OVERALL ASSESSMENT OF NEWTON MATHEMATICS PROGRAM

Teachers, administrators, and parents were asked their overall attitudes toward the Newton Mathematics Program. The following percents of these groups indicated agreement with the following statements:

- *I enjoy teaching mathematics:* 91% of E teachers, 100% of M teachers, and 100% of H teachers.
- *I consider myself a “master” mathematics teacher:* 35% of E teachers, 63% of M teachers, and 47% of H teachers
- *I consider myself an effective supervisor of teachers in the area of mathematics:* 47% of administrators indicated agreement.
- *Students learn mathematics best in classes with students of similar abilities:* 18% of E teachers, 77% of M teachers, and 88% of H teachers. In response to a similar question, 20% of administrators indicated agreement.
- *Overall, the way we group students results in the best possible education for every student:* 26% of E teachers, 37% of M teachers, and 56% of H teachers. In response to a similar question, 22% of administrators indicated agreement.
- *I am comfortable with my child’s current placement (level) in mathematics:* 73% of M parents, and 63% of H parents agreed.
- *I believe my child would benefit from more heterogeneous (mixed ability) grouping in mathematics:* 12% of M parents and 18% of H parents agreed.
- *I am comfortable with my students’ overall progress in mathematics:* 86% of E teachers, 83% of M teachers, and 90% of H teachers. In response to a similar question 39% of administrators indicated agreement. When parents were asked a similar question about their own children, 54% of E parents, 60% of M parents, and 55% of H parents agreed that they are comfortable with their own child’s overall progress in mathematics.
- *I am satisfied with the support my child receives at school in preparing for the MCAS:* 54% of M parents, and 63% of H parents agreed.
- *I have confidence in the long-term benefits of the math program for students:* 55% of E teachers, 83% of M teachers, and 94% of H teachers. In response to a similar question, 64% of administrators indicated agreement. When parents were asked the same question, 42% of E parents, 55% of M parents, and 68% of H parents agreed that they have confidence in the long-term benefits of Newton’s math program for their children.
- *Overall I am satisfied with the mathematics education my child has received in the Newton Public Schools:* 40% of E parents, 57% of M parents, and 61% of H parents.

MATHEMATICS PROFESSIONAL DEVELOPMENT

Teachers were asked to select from a checklist the areas in which they believe they most need professional development or ongoing support and from another checklist about the format for professional development that they prefer. The following show the percents of the different grade level groups of teachers who chose various topics and formats:

- Elementary teachers: 59% *Learning how to use technology in mathematics instruction*, 56% in *Learning how to use inquiry/investigation-oriented teaching strategies*, 43% in *Developing students' conceptual understanding of mathematics*.
 - Middle School teachers: 63% *Learning how to use technology in mathematics instruction*, 63% in *Teaching groups that are heterogeneous in ability*, 57% in *Learning how to teach mathematics in a class that includes students with special needs*, 43% in *Providing deeper coverage of fewer mathematics concepts*.
 - High School teachers: 59% in *Teaching groups that are heterogeneous in ability*, 56% in *Learning how to use inquiry/investigation-oriented teaching strategies*, and 53% in *Making connections between mathematics and other disciplines*.
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- Elementary teachers: 66% *Workshops on mathematics teaching held at your school*, 64% *Observation of other teachers*.
 - Middle School teachers: 70% *Observation of other teachers*, 63% *Workshops on mathematics teaching held at your own school*, 63% *Developing curriculum or curriculum support materials in Newton or outside*.
 - High School teachers: 72% *Workshops on mathematics teaching held at your school*, 63% *Observation of other teachers*.