



Hingham Public Schools
Mathematics Program Review
March, 2021

Introduction

This program review focuses on the Mathematics Department since May, 2016. Much of the review will speak to the changes in the department over that time as well as our questions about the overall program as we move forward. Many of the concerns that were discussed in the prior review revolved around meeting the demands of the 2011 Massachusetts Curriculum Framework for Mathematics (the Frameworks). The Frameworks were still relatively new and we were nearing the end of significant change at that time. The Frameworks remain an important guiding force, with a 2017 update, as we continue to aspire towards reaching all of the teaching demands that they lay out. The review discusses the implementation of the newest version of Everyday Mathematics in the elementary level, the challenges of meeting curriculum adjustments in grades 6-12, and the benefits that we have reaped from our adjustments to the Frameworks. The conclusion addresses questions and concerns about how we move forward as a department.

Description of Program

During the 2008 - 2009 school year, we adopted the 2007 Everyday Mathematics program in grades K – 5. This program was developed at the University of Chicago with substantial funding from the National Science Foundation. It is now marketed by McGraw-Hill but still receives substantial support from university researchers, particularly at the University of Chicago. McGraw-Hill released Everyday Math 4 (EM4), in 2014 (copyright 2016). We were early adopters of the new program which brought forth solutions to many of the problems that we had identified with the prior edition of the program. The newest version is aligned to the 2017 Massachusetts Curriculum Framework, and was adopted in grades K – 2 during the 2014 – 2015 school year. Grades 3 – 5 adopted the new program during the 2015 – 2016 school year. Some key components of Everyday Math 4 include:

- Full alignments to the 2017 Massachusetts Curriculum Framework for Mathematics. In 2011 many publishers and programs, including Everyday Math, simply added units of missing content to align their books to the new framework. EM4 took the time to realign all of their lessons, remove material that was no longer pertinent, and add new content in the appropriate lessons.
- Coherence: Teachers start at lesson 1 from unit 1 and move forward in a linear fashion. There is much more clarity in the direction of the program and hence, more cohesion across the district. The Elementary Math Specialists still provide pacing guides that include additional suggested activities to support content areas where data trends reveal a need for further instruction.
- EM4 embeds the eight Standards for Mathematical Practices (Appendix A-33, 34), also referred to as ‘habits of mind,’ into the program. Students are inherently asked to make sense of problems, to construct viable arguments, to attend to precision, and to persevere through difficult problems. The Mathematical Practices are all hallmarks of good teaching. By having them embedded into the program, teachers with varied backgrounds and strengths all have the opportunity to approach teaching units of instruction similarly.
- Each unit in EM4 includes a 2-day Open Response lesson in which students solve a challenging problem that involves more than one possible strategy or solution. Students are asked to defend their own reasoning and make sense of the reasoning of others. These lessons focus on students’ abilities to articulate their thoughts and to work through difficult problems that do not entail a high level of scaffolding. Most of the Standards of Mathematical Practice are synthesized in these lessons.
- The Everyday Math program is built upon curriculum spiraling and students having the ability to revisit learned topics multiple times. The program includes a curriculum spiral tracker that helps educators understand if a skill is introductory, in the revisiting stages,

or in the mastery stage. This clearly articulated guide allows teachers to more confidently move forward with introductory topics as they know where and when they will revisit them.

- The EM4 program materials come as all-in-one units. Each lesson contains warm-ups, lessons, practice problems, teacher guides, differentiation, games, and extension in the same place. This ease of access provides teachers with more opportunities to meet the needs of all of their learners.
- EM4 offers a robust technology component to teachers, students, and parents that includes tutorials, games, interactive tools, homework help, online text, daily lessons, quiz/test preparation, and parent information centers at home. Each lesson in grades 1 – 5 is available online and teachers utilize the interactive components of the lessons across all grade levels. Teachers are also able to use the class management system to track student progress and growth by each individual skill on a daily basis. Teachers have been trained to use this technology over the course of multiple workshops and professional development opportunities since the adoption of EM4.
- EM4 develops a rich vocabulary in students that is vertically articulated from K – 5. For example, kindergarten students begin to classify shapes by identifying “vertices” and other characteristics. By grade 5, students are engaging in higher-level geometry activities that require them to create a “hierarchy of polygons” based on defining attributes of shapes. Teachers expose students to multiple vocabulary words to familiarize them with common language and develop their breadth of knowledge. In addition to EM4’s rich use of mathematical terms, the Elementary Math Specialists developed a mathematics vocabulary glossary for grades 3-5 that incorporates all terminology used in standardized testing since 2016.
- EM4 students learn mathematical concepts in many representations – concretely, verbally, numerically, pictorially and (where appropriate) abstractly. Students learn mathematics by actively engaging in mathematics, rather than passively observing and mimicking a teacher doing problems. Through rich classroom discourse, students are able to make connections between these representations and demonstrate a deeper conceptual understanding.
- The entirety of the EM4 program focuses on developing number sense, in particular, understanding the flexibility of a base 10 system. Students are taught to think about numbers as sums of their parts. For example 231, is $200 + 30 + 1$. This type of thinking is a cornerstone of elementary math. It creates a deeper understanding of number value and provides more credence to learning both non-traditional and traditional algorithms for operations.

Hingham's elementary curriculum is fully aligned with the 2017 Massachusetts Curriculum Framework for Mathematics. Curriculum guides and pacing guides are provided to all teachers. All teachers give common unit assessments that are graded with a common scoring guide. The scoring guides include the Massachusetts Framework standard for each assessment item as well as the relevant Standards Based Report Card category. These guides and unit assessments, in conjunction with continuous support from the Elementary Math Specialists help ensure a consistent implementation of the mathematics curriculum. This coordination aligns with the newly developed Power Standards (Appendix A-25, 26, 27), Standards Based Report Cards, common assessment cover sheets (Appendix A-24), and standards benchmarking documents that are used across the district.

We maintain a Basic Fact Policy (Appendix A-18, 19, 20) that is aligned to the Frameworks for all elementary students to ensure that they have consistent opportunity, across the district, to develop basic operations skills through grade 5. We have also introduced REFLEX math across the four elementary schools to support our fact fluency initiative. This digital program adds to our set of tools for practicing fluency and provides data for student growth over a school year. Classrooms are heterogeneously grouped and differentiation of instruction is provided within the classroom setting. Differentiated instruction techniques are supported through coaching and modeling by the Elementary Math Specialists who have focused their embedded professional development on Number Talks, Math Workshop Model, and Student Centered Coaching (Appendix A - 28). MathPlus, a pullout program in Grades 4 and 5, is designed to provide additional challenge for some children who have demonstrated an aptitude for higher order problem solving in mathematics. (Appendix A-14, 15, 16)

There is an Elementary Math Specialist assigned every other day to each elementary school. The single biggest time commitment for the Elementary Math Specialists entails working with classroom teachers to improve Tier 1 instruction for all students, including significant time spent on evaluation and editing of curriculum and assessment. They focus on modeling lessons, best practice strategies, and the Standards for Mathematical Practice for teachers, using data to make decisions about curriculum and individual students, and coaching and providing resources to improve differentiated instruction. Their second most important responsibility entails supporting the consistent implementation of the Everyday Math 4 program across the district. The Elementary Math Specialists also teach the MathPlus program in both grade 4 and 5 and provide many other forms of leadership across the district. A brief list of some of their other responsibilities is below.

- Contribute to and most often lead professional development on elementary teacher in-service days.
- Lead district-wide initiatives, such as REFLEX, Math Workshop Model, Number Talks.
- Analyze weaknesses in standardized testing to make curriculum adjustments.

- Coordinate grade 2 – 5 math contests, gather results to submit to the newspaper, and coordinate Elementary Math Awards night.
- Help develop and revise district-wide Standards Based Report Cards with common grading and implementation.
- Help develop and revise Standards Progressions and Power Standards.
- Maintain Elementary Math website with resources for students, families, and teachers.
- Coordinate with grade 6 teachers to help create greater consistency for the transition from grade 5 to grade 6.
- Organize a Family Math/STEM event at each elementary school.
- Coordinate with the Director of Mathematics to develop curriculum/discussion topics for Elementary Math Committee meetings.
- In coordination with the principals and director, prepare mathematics budget and ordering of materials.
- Attend and lead elementary job-a-like group meetings to stay current with new practices and trends.
- Support Title 1 teachers and tutors with curriculum understanding, technology, and resources. Ensure that Title 1 interventions and support align with overall elementary math goals. Write K-5 screening assessments and scoring guides.
- Developed Title 1 Summer Academies curriculum (Appendix A-29, 30).
- Create monthly and seasonal district-wide math newsletters highlighting math department policies, current news, activities, articles, games, and teacher support.

We work hard to create a consistent curriculum across four different elementary schools, each of which has unique needs. We must prioritize the most important tasks, and we appreciate the flexibility and understanding of the elementary principals as they support the Elementary Math Specialists in doing so.

Grade 6 is a transition year. Classes are heterogeneously grouped. We offer a Math Enrichment period once every four days for about 75 - 80 students. This class focuses on problem solving and “playing” with mathematics. Enrollment is based on 4th and 5th grade MCAS, NEML, and CML scores in conjunction with 5th and/or 6th grade teacher recommendation. We also offer 6th Grade Title 1 Math Lab to provide support for struggling 6th grade students. 1.4 Math Tutors (down from 2.0) provide push-in and pull-out support for this program. Enrollment in this course is based upon a combination of 4th and 5th grade MCAS scores and 5th and 6th grade teacher recommendation.

In grades 6 – 12, twenty-five teachers (24.2 FTE) provide thirty different full-year courses and 2 semester courses. Mathematics courses are designed for specific levels of achievement and most courses at the high school are taken by students in two or more grades. We do not teach Level 4 courses in mathematics. Students in grades 7 – 12 are able to take courses at three college

preparatory levels, one at Level 2 (honors) and two at Level 3 (college prep). In addition, Advanced Placement courses are offered to juniors and seniors in AB Calculus (the equivalent of a semester college calculus course), BC Calculus (the equivalent of a full year college course), and Statistics. There is a three-year graduation requirement in mathematics. However, the vast majority of students take four years of mathematics; 98% of current seniors take mathematics with 77% taking a course at least as rigorous as Pre-Calculus, which is up from 68% during the last math program review.

There are two sequences of College Preparatory classes, Quadratic and Linear. The Quadratic sequence aligns fully to the 2017 Massachusetts Curriculum Framework for Mathematics. The Linear sequence focuses on the most essential parts of the Frameworks and is equally as rigorous as the former 2004 standards. Students have an opportunity to enter an Accelerated College Preparatory sequence in 7th, 8th, or 9th grade (Appendix A-11, 12). These courses are the same as those offered in the Quadratic sequence, however, some students are able to move a year ahead which ultimately opens the option of Calculus and other higher level math courses for students who are very good college preparatory math students. We are focused on student growth and this sequence also provides an easier pathway to transition to honors math all the way until 10th grade for students who develop later than their peers.

Advanced Placement Computer Science Coding is a year-long course and Introduction to Computer Science and the Tech Squad course are two semester length courses at the high school that are all taught by members of the mathematics department. Additionally, the Coding Clubs at both the middle and high schools are all organized and supervised by math department staff.

Departmental midyear and final exams are one source of student and program assessment. The Massachusetts Comprehensive Assessment System (MCAS) is given in mathematics in grades 3, 4, 5, 6, 7, 8, and 10. Additional data is provided by SAT I, SAT II, and Advanced Placement testing. District developed common assessments from grade K-12 provide a wealth of data for educators as they are able to compare students to district norms from year to year. Portfolios of a student's math work, including the midyear assessment, end of year assessment, and results of Basic Arithmetic Facts assessment (Appendix A-18, 19, 20) are kept from grades 1 through 5. Through grade 6, they are passed on to the following year's teacher. At grades 6 – 12, folders are kept for each student in every course, and contents can be used to analyze individual student performance and to monitor the kinds of learning and assessment activities that are used by teachers. Although sufficient MCAS practice activities are provided in all courses through grade 10, we believe that if the curriculum is taught properly, students will achieve appropriate levels of success on the MCAS exam. Substantial practice activities for the Advanced Placement exams are provided in the Advanced Placement courses. Co-curricular activities include several contest experiences (Appendix A-10), a very active high school math team, Hour of Code Week for all HHS students, and Coding Clubs at the high school and middle school level.

Changes in the Mathematics Department

2017 Massachusetts Curriculum Framework for Mathematics:

The changes that resulted from the 2017 update to the 2011 Massachusetts Curriculum Framework for Mathematics were nowhere near as comprehensive as the changes that were put into place in 2011. Audits of all curriculum materials resulted from the 2017 update. This provided us with an opportunity to revisit the massive changes that took place over the years following the implementation of the 2011 standards. The process entailed ensuring vertical articulation of the program with deep dives made into the progression of standards across elementary, middle, and high schools.

MCAS 2.0:

A new computer based version of the MCAS exam came with its own set of challenges. A portion of reviewing the program's alignment with the 2017 Massachusetts Curriculum Framework for Mathematics was to ensure that we were teaching the appropriate material for a new and more challenging MCAS exam. Educators across the district completed considerable professional development, internal and external, to ensure that they were in the best position to prepare their students. Infrastructure trials and online practice tests were and continue to be administered across each building. The Elementary Math Specialists developed and provided practice materials for teachers and students when little was initially available. (Appendix A-40, 41) They worked with elementary administration and educators to successfully familiarize students with the new digital tools, skills, and technology language. The Mathematics Director worked closely with middle and high school administration and educators to ensure that students were prepared. (Appendix 36, 37, 38, 39, 42, 43) Educators invested professional development time into learning new technologies (Edulastic, Desmos, Geogebra, Quizizz, Quizlet, Kahoot!) to help provide classroom experiences that are similar to MCAS 2.0. Additionally, educators spent significant time creating practice websites and embedding new question types into assessments and daily warm-up activities. The Director of Mathematics hosted professional development for 30 local mathematics directors with the Massachusetts DESE mathematics MCAS test developers, hosted 25 local mathematics directors to review and provide feedback to the state on the initial Grade 10 MCAS test, and was part of a 12 person panel to review the rigor and alignment of the 2019 Grade 10 MCAS.

We are still unsure of what the final version of MCAS 2.0 will look like and what the standards will be to determine Competency Determination for graduation. Students who are appropriately learning mathematics are trained to show their work and express their reasoning. A computer based exam can develop a hurdle for students who are used to working in a certain paper-based workspace. Additionally, we need to train many of our students to improve the precision that they use to transfer material from computer screen to paper.

New Courses:

Introduction to Computer Science:

Introduction to Computer Science was a new semester-long course that began in September of 2016. This course addresses the principle elements of programming in multiple languages but has a focus on Java. The course is differentiated by an honors and college prep curriculum taking place in the same classroom. Students who successfully complete the honors version of the course should have the prerequisite skills to take AP Computer Science.

Advanced Placement Computer Science A - Coding:

This is a college-level course following the Computer Science A outline as presented by The College Board. The course emphasizes object-oriented programming methodology with a concentration on problem solving and algorithm development. It also includes the study of data structures, design, and abstraction. At least 5 hours of preparation outside of the classroom are required per week. Students must take the Advanced Placement exam in May. This course requires extensive reading and writing so we ask students who are enrolling to also consider their relative strength in ELA.

The department recognizes that it gives up two full teaching periods to accommodate these courses. However, we deem both of these courses as highly valuable to the overall education of our students and, for now, they can be taught within the confines of our current staffing. We had to stop running our third computer science course, Tech Squad, to accommodate for the expansion of our coding program but plan to run all three courses in the future as they all serve different student needs.

Level 3 Pre-Algebra for Grade 7:

Beginning in 7th grade, students now have the option of taking 3 courses. Level 3 Math 7 teaches the Massachusetts Curriculum Framework content for grade 7. Honors Pre-Algebra is an accelerated course that teaches all of the 7th and 8th grade standards in 1 school year. This course provides very little scaffolding, students are expected to have complete fluency with fractions, integers, and operations and students are expected to combine multiple skills, including those previously taught, in order to solve problems. The Level 3 Pre-Algebra course is the new addition to the 7th grade courses. It is much closer in content to the L2 course than it is to the Frameworks course. Level 3 Pre-Algebra also teaches almost all of the 7th and 8th grade standards in one school year. However, there is more scaffolding and differentiation as well as less application of skills to problem solving than in the honors course. (Appendix A-47) Students in this sequence are also expected to have complete fluency with fractions, integers, and operations. The addition of this course was received very favorably by students, parents, teachers, and counselors alike and directly addressed an issue where we had close to 60% of grade 7 students in honors math for 4 years in a row.

Level 3 Algebra 1 – Quadratic Emphasis in Grade 8:

This course was first added to the grade 8 curriculum for the 2015-16 school year. The course is fully aligned with the high school course of the same name. It has been a large undertaking by teachers dedicated to providing an authentic college preparatory Algebra 1 class for middle school students. Significant professional development has been committed to aligning pacing guides, assessments, and expectations to ensure that there is consistency when the two courses are being taught under different schedules at the two schools. The importance of this course lies in its ability to put students on an accelerated college prep sequence or to move to honors Geometry as they mature and move to the high school.

Accelerated College Preparatory Sequence:

The Accelerated College Preparatory Sequence opens a pathway for many more students to potentially reach a calculus-based course by senior year. (Appendix A-11, 12) We have many strong math students who may not have, or yet developed, either the abstract thinking skills or the ability to synthesize multiple ideas that are necessary to participate in honors math classes at the middle school level. However, many of these students have very strong fundamental algebra skills and can develop equations and manipulate algebraic expressions with continued independent success. The Accelerated College Preparatory Sequence provides these students an opportunity to push forward with a rigorous curriculum at a pace that is appropriate for them. Doing so allows students to develop skills that would be necessary to move to an honors course if their brain-development, desire, and work ethic leads to that path.

Most students will remain in the Accelerated College Preparatory Sequence until their senior year when they will move up to Honors Calculus or proceed forward to Level 3 Analysis: Introduction to Calculus. Nationally, about 15% of high school students take some version of calculus in high school. During the 2019-20 school year, 46% of Hingham seniors were enrolled in a calculus-based course. That number increased to 56% for the 2020-21 school year. The courses in the accelerated sequence are the same as those in the normal college preparatory sequence, it is just that these particular students move a year ahead of their peers in middle school. Under our past system, a student was forced to take an honors course where they often earned a low C or D grade. The next year they had to move back down a level, often feeling defeated and turned off to math. Our revised model is built around growth and building confidence as students move through the program. The value of this sequence for our students cannot be understated.

New Special Education Math Classes:

There have been multiple levels of collaboration between the math and special education department. We have developed co-taught Algebra 1 – Linear Emphasis and Geometry – Linear Emphasis courses at the high school as well as reestablished the Algebra 2 co-taught course. These courses were new for the 2019-20 school year. Math staff and special education staff have

spent significant time working together to establish norms, to develop a range of tools for scaffolding material, and to appropriately modify assessments so that they still assess the standards laid forth in the 2017 Massachusetts Curriculum Framework.

In addition to the co-taught courses, we have added a small group instruction special education courses in grade 9 and 10. The grade 8 small group instruction teacher is now dual certified in both Math and Special Education. The special educators assigned to small group instruction in grade 6-8 have all co-taught with math educators for multiple years to ensure consistency of high standards and to implement best math practices in their own instruction.

Grade 6 Title I Math Support:

We have successfully added Title I math support to our intervention model at the middle school. Two Math Tutors offer push-in support in the grade 6 classrooms while also providing additional teaching in the Grade 6 Math Lab. Students scheduled for Math Lab support receive additional math instruction every other day. We have streamlined a process for identifying the majority of our students through referral from grade 5 educators. However, the program is fluid and we are able to add and remove students quickly as the grade 6 teachers begin to understand students' needs. We use the IXL and Easy CBM programs to gain baseline information about students' skills, to track progress, and to provide a blended learning opportunity where students can work to remediate deficits while also receiving support on immediate instruction.

Standards Based Report Cards:

The shift to Standards Based Report Cards (SBRC) involved significant work on the part of elementary teachers. Although the report card in and of itself is not a vehicle for instructional change, the grade 3-5 teachers spent significant professional development time over the course of four years to transition to new assessment practices and understanding of student proficiency with the Massachusetts standards. The work completed at each grade level entailed an in-depth decoding of the elementary standards, a cross reference to our current practices, and coordination with the Everyday Math program. In addition to the SBRC, the grade level educators developed many ancillary documents to help with the process. Power Standards were identified for each grade to ensure focus on the most essential items of each year's curriculum (Appendix A-25, 26, 27). Progression of the major standards through the grade levels were created to help grade level teachers develop a full understanding of where and how their curriculum fits into the larger context of the elementary curriculum (Appendix A-21, 22, 23). Cover pages for every assessment were created by the Elementary Math Specialists to help teachers shift their mindset from percentage based grades to standards based achievement (Appendix A-24). Grade level benchmarking documents were produced to create mid-year targets for the end-of-year standards that appear on the SBRC. Each grade level SBRC itself was created, evaluated, and adjusted many times over the course of three years. New mid-term progress reports were developed for

grades 3-5. Lastly, communications to families describing the Standards Based Report Cards and how to understand the grading were drafted and shared with families.

This work was done across the Mathematics and ELA standards. Over four years, we employed multiple full-day professional development days for staff that were embedded during the school year and also took place during the summer. It also was the major focus of every Math and ELA Elementary Committee meeting over that same time span. The work was tedious and exhausting but ultimately elementary educators spent very valuable time exploring their grade level standards, making collaborative decisions across multiple schools, and making connections between the standards and the Everyday Math 4 program.

Change in Leadership:

Dr. Galo was Director of Mathematics from 1978 to 2001. Mr. Holley worked under Dr. Galo for that entire time and became Director of Mathematics in 2001 when Dr. Galo became Superintendent. Mr. Jewett worked under Mr. Holley from 2003 until 2013. Mr. Holley partially retired in June, 2011 while Mr. Jewett worked as the Lead Teacher for the Mathematics Department until 2013 when he assumed the full K-12 position. As a result, we have had steady leadership and consistency in mathematics for decades.

Staff Changes:

As a result of retirements, enrollment increases, and other departures, there are six new math teachers in the department since the last program review. All are highly qualified in terms of licensure as well as experience and ability.

New staff:

- Mallory Lynn – HHS
 - James Madison University – B.S. Mathematics and B.S. Spanish
 - James Madison University – M.A.T Secondary Education
- Steven Sadowski – HHS
 - UMASS Lowell – B.A. Mathematics Education
 - Berklee College of Music – B.A. Music Education
- Alexandra Boyd – HHS
 - Bridgewater State University – B.S. Mathematics
 - Bridgewater State University – M.A.T. Mathematics
- Louis Pires – HHS
 - UMASS Amherst – B.A. Chemistry

- Robert Tiews – HMS
 - University of Michigan – B.A. Psychology
- Jessica Kitchen – Foster and PRS
 - Stonehill College – B.A. Elementary Education and Psychology
 - UMASS – Boston – M.A. Education

The high school employs one Mathematics/Science focused para-educator. This role is extremely valuable to supporting learners in Algebra 1 and Geometry. We have been fortunate to have a fully licensed math educator in this position for the past 12 years. The last 4 people in this role have all moved on to full time teaching positions, two of those positions were at Hingham High School.

All of these teachers have been positively impactful on the department. As a group, they are creative, willing to take risks in the classroom, very dedicated to their jobs, and show a high degree of professionalism. The quality of our program lies in the quality of our teachers. We have been fortunate to replace excellent veteran teachers with excellent young teachers who we hope will be in the math department for a long time. Over the past 8 years we have hired 44% of the math teaching staff.

Strengths of the Program

Appropriate Educational Opportunities for All Students:

We have implemented many different curricular changes to ensure that all students have an opportunity to be successful at an appropriate level. The mathematics department has worked incredibly hard to develop pathways that allow students to continue to develop their strengths through middle school and high school. The long standing narrative that, *“if a child is not in honors by seventh grade, then they will never have the opportunity to catch up”* is simply not true in our system. The articulation of the middle school and high school program is designed to meet as many students as realistically possible at an appropriate level and is carefully constructed to allow for relatively easy growth and level changes from 7th through 10th grade.

We continue to challenge our best mathematics students in a rigorous honors program that leads to three levels of calculus or alternatively to an introduction to calculus course. Our students have opportunities to participate in local, regional, and national mathematics contests throughout the grade levels. (Appendix A-9, 10) We boast higher than normal participation for our high school math team (2019 and 2020 League Champions), where it is not uncommon for us to have thirty students compete in a meet. Our best students in grades 4, 5, and 6 participate in pullout math enrichment classes that challenge them to problem solve and to think abstractly.

Our most struggling students are offered support through differentiation, intervention, and the Title 1 program at the elementary schools. In grades 6 - 8, struggling students are supported by two additional Math Prep periods each 4-day cycle. These courses review and reinforce basic skill work, support curriculum currently being learned in the everyday classroom, and preview new material when possible. There is also a special education small group instruction math course in grades 6 through 10 for the students who need additional support to master the curriculum. In high school, we find smaller classes in Geometry – Linear Emphasis and, in particular, Algebra I – Linear Emphasis. These courses are often supported by a specific mathematics/science focused para-educator who, for the past 10 years, has been a highly qualified, fully licensed math teacher. We have piloted and are continuing the use of the ALEKS (Appendix A-35) program as part of our intervention strategies in Algebra I. In conjunction with the Special Education Department, we run an after school Algebra 1 support class for selected regular education and special education students. Similarly, we run a 6-8 week MCAS support course for selected grade 10 students in the weeks leading up to the 10th grade MCAS. The Director of Mathematics typically provides 10-15 hours of individualized tutoring to the small number of students who may not pass the MCAS on their first attempt.

The vast majority of our students lie somewhere in between the extremes described above. The past four years have shown tremendous growth for this population. The Everyday Math 4 program promotes creative thinking and problem solving challenges for all of our students. Our first classes who have been through the entire Everyday Math 4 program are now in grade 7.

Grade 6 had adopted the Big Ideas textbook as part of their alignment to the Frameworks near the end of the last Program Review. Big Ideas, as implemented by our staff, asks all students in these heterogeneously grouped classes to apply the skills they acquire to real-world situations. In grade 7 through Level 3 Pre-Calculus, The Frameworks raised the standard for all of our students. Our Level 3 courses have all moved closer to the Level 2 (honors) courses in terms of content and application of skills. Students are being asked to perform more modeling tasks with mathematics and, due to excellent efforts of the staff, are finding ever increasing ways to apply mathematics to authentic problem solving scenarios.

The largest initial impact of The Frameworks was clearly on our Level 3 courses. The demands of The Frameworks to push significant amounts of material into earlier grades forced us to deeply consider what was best for children. In the end, we began the hard work of opening up Accelerated College Prep pathways for many of our Level 3 students. We thoughtfully moved a non-honors high school Algebra 1 class into the grade 8 curriculum. This alleviated a major problem for the 50+ students who were to move down from honors after grade 7. In response to a significant imbalance in the honors Pre-Algebra course in grade 7 we added a college prep version of that class. We received significant positive community feedback for implementing these changes.

The new curriculum pathways directly address concerns that we had identified as far back as 2009 when we began a new course, Algebra 2 with Conics (now Algebra 2 with Trigonometry). At the time, there was too large of a gap between the Level 2 and Level 3 curriculum. Very good level 3 students, who were pursuing math and science after high school, were not being challenged in ways that fully prepared them for our Pre-Calculus and Calculus courses. Many students who could not master the curriculum of the Level 2 courses would move to Level 3 where they would earn A's with little effort. It was also very difficult to move to Level 2 after 7th or 8th grade. Students who switch to Level 3 from honors in our new curriculum find significant and sufficient challenge in their Level 3 courses. Additionally, "late blooming" students who excel in Level 3 Pre-Algebra or Algebra I – Quadratic Emphasis now have an opportunity to move to the honors sequence. The current senior class has 56% of students taking Introduction to Calculus or higher this school year and 77% of the senior class taking at least Level 3 Pre-Calculus.

Student Success:

The appendix (Appendix A-1 through A-8) includes results of SAT I, SAT II, Advanced Placement exams, and MCAS. The majority of Hingham High School students enroll in mathematics courses that are above and beyond graduation requirements and exceed college admission requirements as well. 98% of seniors took a math course with 77% taking a course that is at least as rigorous as Level 3 Pre-Calculus. Our students do well on the SAT, Advanced Placement exams, and Grade 10 MCAS. Over the course of the previous review, participation

in the Mathematics Level 1 and Level 2 SAT II had been consistently high in Hingham with an average of 69.4 students taking the exams each year. With fading emphasis on this assessment from colleges and universities, that average has fallen to 46.5 students per year. Our mean 2019 Mathematics SAT score stands 9th among the benchmark communities but is the best among all of our surrounding communities (Appendix A-3). The percentage of students who earn scores of 3 or above on AP exams continues to consistently exceed the state and national averages by a large margin (Appendix A-5-8). We have averaged 93.3% of students earning Advanced or Proficient status on the 10th grade MCAS from 2015-18. The new, intentionally more difficult, scoring system had 82% of Hingham High School students earning the status of Exceeding or Meeting Expectations. This has occurred irrespective of widely varied scores on different middle school exams. In the end, our students get to where they need to be.

Staffing:

We have a highly qualified staff, with diverse backgrounds, who work very hard to meet the needs of their students. All teachers have the ability to teach almost every course in their building. To the extent possible, we have teachers teach the courses that they most enjoy and we work hard to have teachers teach the same course for multiple years in a row. This practice has created leadership in each course and has allowed teachers to focus on reflection, adaption, and improvement of instruction from year to year. Teachers are encouraged to take on leadership roles within the department and share in the responsibility of making good decisions that guide the department forward (Appendix A-17).

A constant hallmark of excellent educators is their desire to continually improve their practice. The members of the Mathematics Department are highly collaborative and are constantly seeking opportunities to learn and improve. The staff works in teams and actively seeks each other's expertise. They share resources, discuss best practices, participate in inter-departmental peer observation, and bring new ideas to common planning time, department meetings, and time outside of the school day. Mathematics teachers have continually participated in professional development opportunities on a local and national level. In the past five years, staff members have participated in the National Council of Teachers of Mathematics Regional Conference, The Advanced Placement Summer Institute at St. Johnsbury Academy, the Mathematics and Computer Science Collaborative Series at Bridgewater State University, the Massachusetts Mathematics Association of Teacher Educators Annual Conference, College Board Advanced Placement test grading, Massachusetts Computer Using Educators Conference, National Future of Education Technology Conference, and a plethora of graduate level and professional development courses focused on technology, special education, mathematics content, and pedagogy. Internally, the majority of the 6-12 Math Department staff participated in district provided Technology in the Secondary Classroom and Writing Math Assessments in the Secondary Classroom to improve their relative strengths in technology based assessment tools.

The Mathematics Department staff members are very active members of the school community. All members of the staff participate and contribute to the school culture outside of the classroom by attending/participating in/chaperoning many extracurricular events. In particular, 89% of the staff maintains specific leadership responsibilities involved in: coaching, advising, coordinating intramurals and clubs, coordinating charitable school/community events, teaching after school support classes, chaperoning major student trips, mentoring students, mentoring new staff, representing the Hingham Educators Union, performing the role of NEASC steering committee chairpersons, representing the school-based advisory councils, and providing professional development for their own peers.

The Elementary Math Specialists excel at their jobs. They continue to exceed expectations and are the face of the elementary math program. In conjunction with the Director of Mathematics, they set yearly professional development goals for the elementary teaching staff and ensure, to the extent possible, consistent and appropriate instruction across all four schools.

Common Assessments:

The team model, the 2011 and 2017 Massachusetts Curriculum Framework for Mathematics, advancements in technology, and K - 12 oversight of the department has led to a more consistent set of standards across all courses. After 7 years of significant work, we developed common end-of-unit assessments for all of our Level 3 courses from grade 6 through 12. This holds true for almost all of our honors courses as well. Our end-of-unit assessments assure that students are being challenged with the same level of rigor across all courses. Within each unit, teachers are trusted and are free to teach the curriculum as they see fit, with the understanding that each student will have the same benchmark assessment to ensure consistency. This approach allows teachers to still be creative within their units and to highlight the different topics that they enjoy or find intriguing. Maybe the biggest power of the common assessments is how they help educators guide discussion about best teaching practices in the classroom. The common assessments are living documents and teams of teachers make decisions together to adjust the assessments as they see fit.

Use of Technology:

Teachers across the Mathematics Department have taken to heart Mathematical Practice #5: Use Appropriate Tools Strategically. The ever increasing availability of information has forced us to question what material needs to be memorized versus what material needs to be understood. As of 2019 none of us had felt as if we had completely mastered any new technology. Each new tool needs significant learning time at the outset but also needs long-term commitment and practice to improve mastery to the point that it improves classroom outcomes. However, we had taken big steps forward to identify and use tools that allowed us to be more engaging or efficient. 2020 allowed us to gain much of the significant time and practice needed to develop or move

closer toward mastery. We will be better positioned to move forward with technology use in the classroom in the coming years based upon this year's experiences.

Students begin using graphing calculators in grade 8 algebra courses and continue to use them through senior year of high school. The use of graphing calculators helps students make better connections between equations, tables, graphs, and verbal representations; a key component of the Frameworks. For example, instead of focusing on the calculations to find the vertex of a parabola, students focus on the meaning of the change in direction at the vertex in the context of a word problem. They still learn traditional calculations but use graphing calculators to move through multiple problems quickly. Students typically use Texas Instruments calculators, as they are the standard for SAT, ACT, and presumably to continue with the online version of MCAS 2.0. The Mathematics Department loans calculators to those students who cannot afford to purchase one.

Department members are using various online tools throughout the grade levels. Teachers use Desmos to create new graphing activities, create matching games, and explore function properties. Geogebra is an online application that is used so that students can rapidly and continually test conjectures and theorems learned in Geometry class. TI-Nspire technology was introduced to BC Calculus in 2016 to help students deepen their understanding of limits, tangents, and volumes. ALEKS is an artificial intelligence based program that is used to help our Algebra I – Linear Emphasis students reach proficiency in a blended learning environment. IXL and Prodigy provide a similar tool for middle school teachers. Mimio Mobile is used to capture and present student work written on iPads and projected to the whiteboard. Educators use multiple tools like Loom and EdPuzzle to record their own presentation of material and key ideas to promote flipped classroom models. Quizizz, Quizlet, Gimkit, Kahoot! and DeltaMath all offer various formative assessment tools for in class and homework. Teachers are embedding Kahn Academy lessons into their note presentations or pushing them through Google Classroom for differentiation. Fruit-Splat, Math-Duel, and Math-Play all offer middle school students an opportunity to work on grade level operations with integers and fractions in a fun and engaging way. REFLEX math is an elementary math initiative that focuses on fact acquisition through game play. Edulastic is being used across many grades to ask technology rich questions that mimic MCAS and to provide benchmarking data for course recommendations. FlipGrid allows students to capture their thinking through short video assignments. PearDeck has been implemented to develop interactive PowerPoint slides that are teacher paced and allow the whole class to move forward together while teachers monitor student work in real-time. Touchscreen Chromebooks have been piloted for use in high school math classes and for use by much of the 6-12 math staff. ClassDojo has been used to share classroom project updates with parents. IXL has been used at the elementary level and grade 6 to help intervene with students who need skill reinforcement and remediation. Teachers have developed their own websites, invested time into learning Google Classroom, and have recorded their classroom notes to share with students.

Challenges and Concerns for the Math Department

Common Assessments, Test Integrity, and Tutors:

We reached the end of a 7-year cycle of developing common end-of-unit assessments across our curriculum, to be faced with a change in the interpretation of the student record law. Creating new quality assessments is not as simple as just changing the numbers in the assessment. Years of decision making and difficult professional conversations led to quality assessments that assess specific standards in specific ways. The mathematics department had a long standing practice of slowly transferring responsibility of reviewing those assessments to help students' appropriately foster independence. In grade 6 all assessments went home, in grade 7 they went home upon request, and starting in grade 8 students who wanted further review with an assessment were to schedule time to meet with their teacher. As a department we faced challenges with students and adults taking pictures of exams, with quizzes and tests being posted on-line or shared via app, and with paid private tutors providing incentives to students who could procure Hingham exams for them. These situations provided us with significant concerns about protecting the integrity of our assessments. However, we now do not have the leverage to continue our former procedure which has brought forth concerns and conversation about whether we should continue our common assessment practice.

Additionally, we have a large concern about the inequity that is caused by the private tutoring establishment in town. We do not fault parents who have the means and opportunity for pursuing this option for their children. However, the structure of the math pathways is such that there is an appropriate level for each child where they should not need a tutor to access the curriculum. Inherently math work will come more easily to some than others, but children seeking hours of extra assistance each week for math puts an overemphasis on its importance and creates an unequal balance that can cause student stress, erode confidence, and turn students off to the subject. There is a developed narrative that, "*a student needs a tutor to be successful*" in our math program. This leads to students over-reaching, applying disproportionate effort, and often still not learning "successfully" at that given level. This idea is juxtaposed against the equity for students who can never afford tutoring services and who have to take the same exam as someone who has been coached up on it.

Addressing these two problems may be the biggest challenge that lay ahead of us in terms of maintaining high yet equitable standards for all children.

Communication:

The counter balance to having a program that provides as many opportunities as possible for all students is that the program is then complex. There are lots of nuances that people (teaching staff, students, parents, counselors and building administration) need to be aware of to make good decisions about course selection. By and large the math teachers have a strong understanding of where children belong. We undergo comprehensive reviews of how previously

recommended students perform and use student data over multiple years to help inform accurate placement decisions. However, when aspects of the program are new, it entails significant work and multiple years to establish new and appropriate community norms. With the exception of most senior year courses, every part of the program has changed over the past seven years. Some changes are now understood by families but we need to continue to seek better ways to clearly articulate to parents what the different options are for their students. This is particularly true at the middle school level, where it may be more difficult to see the full arc of the program. The mathematics department communicates with families at multiple key points throughout middle school to help families make informed decisions. (Appendix A-44 through A-49) Students who are in the proper courses will grow appropriately, develop an understanding and appreciation for mathematics, and develop confidence. It is very important that we do all that we can to work with parents and students to ensure that they are placed in courses that will lead to success.

It is recognized that it is difficult for our parents to easily access all of this information by simply searching for it on our website. The mathematics department has begun to compile content for the new school website to ultimately improve parent and student understanding of our program. This will take some of the impetus off of direct communication between staff and families for simple problem solving. It will allow families to seek answers to their questions on their own schedule, in a fashion that is comfortable for them.

Elementary Support:

We need to continue to work toward full time, building based, Elementary Math Specialists at all elementary schools. As outlined in the Description of Program section of this report, the Elementary Math Specialists maintain a wealth of responsibilities across the district. We are fortunate to have two outstanding Elementary Math Specialists. However, they currently split their services across four elementary schools and spend the bulk of their time coordinating the curriculum or working with teachers in the classroom. We work very hard to do so, but in our current model, it is not possible to provide all of the support that we deem appropriate for all learners.

The Elementary Math Committee was noted as a strength of our elementary model in the last review. This committee had been comprised of a highly collaborative group of K-5 classroom teachers and special educators who shared ideas and best practices for implementing the Everyday Math 4 curriculum. The structure of this committee changed in 2017-18. While this has been a valuable model for helping to establish standards based report cards in grades 3-5, we have not accomplished much more than that goal over the course of this review.

Maintenance of High Standards:

Teachers who have taught Level 2 for many years know what is reasonable to expect for these highly motivated students. The biggest impact of the 2011 and 2017 Massachusetts Curriculum

Framework for Mathematics probably occurred in grade 7 Level 2 Pre-Algebra. We followed the state guidelines by teaching all the grade 7 and grade 8 standards in one year. Students who are appropriately placed can easily handle the pace of this learning. However, before we developed the alternate pathway, we had three years in a row where 55-60% of grade 7 students enrolled in honors. The long-standing norm by freshman year lies around 25-30% and typically decreases to about 25% from there. This highlights that we were significantly out of balance. Teachers of this course have noted that they had no option but to reduce the rigor in order to ensure that the majority of students were having opportunities to be successful. It was our intention as of the 2020-21 school year to effectively “reset” the grade 7 rigor to appropriately teach the curriculum as we had intended. This includes increased and appropriate rigor in assessment and an adjustment of the recommendation practices from grade 6 teachers. (Appendix A-47) Each major curriculum change that we have made has taken about 4 to 5 years to successfully implement. Next year will be the fourth year of L3 Pre-Algebra. We will monitor this adjustment closely as it should have a positive impact on appropriately placing students at all levels going forward. (See Appendix A-13 for the summary of differences between Level 2 and Level 3 course for the mathematics department.)

We have a long standing practice of students needing to repeat Algebra 1 (at any level) if they do not earn a 70% the first time through the course. This has been a valuable structural component of our program design and is consistent with practices in other local districts. Research does not support having students repeat whole grade levels at the middle school. Due to this, students matriculate to new grades with new standards when they have not always consistently mastered the material from the year before. Algebra 1 is the one opportunity in the math pathways for students to pause, repeat, and build some positive momentum that can carry them through high school and MCAS. By continuing this practice, we have been able to maintain a high standard for students, particularly in the Algebra 1 – Linear course, while still being able to modify and adjust curriculum in ways to meet student needs. Students who practice effective effort and work hard at Algebra 1 develop long-term skills for future success. For some students that occurs over 1 school-year, while others gain much greater mastery revisiting the same topics, in the same book, in a similar learning environment during a second year. To date, every student for the past 18 years who has followed this path has then gone on to pass the grade 10 MCAS. Maintaining this high standard and pathway is important as we evolve as a district. As we begin to make bigger structural changes to the special education model, we need to be mindful of the impact that small group instruction math courses and the co-taught Algebra 1 course will have on our students’ ability to graduate from high school. We need to provide students with ways to successfully access the curriculum but we do not want to do it at the cost of effective effort and ownership on behalf of the student. We also do not want to remove the opportunity to take Algebra 1 for a second time when we have consistently seen our most struggling students be able to make tremendous growth in their second year.

State and Federal Accountability Regulations:

No Child Left Behind, the 2017 Massachusetts Curriculum Framework for Mathematics, and MCAS 2.0 all continue to raise the bar for students. This has created an excellent curriculum for the vast majority of our students. As a department, we have made deliberate choices to teach students the mathematics that is appropriate for their age and ability. This means that some of our students will only be exposed to the most important standards of the Frameworks. This is appropriate for the student but may affect the accountability data that a student contributes to the district. It is imperative that we keep the bigger picture in mind. We are trying to ensure a path to graduation and post-secondary education for all students. The past four years' grade 10 MCAS show that at least 93.3% of our students were proficient or advanced and all students have passed the exam. Additionally, 100% of our students are reaching Algebra 2, which is the minimum required course for admission to the UMASS system (Appendix A-50, 51).

Demands on Teacher Time:

This was a major concern from the last Program Review and we have seen little positive change over the past five years. Increasing demands on teachers leaves them with less time to focus on their teaching and planning. A combination of new and old constraints including, but certainly not limited to, the Massachusetts Educator Evaluation System, NEASC, DCAP communication, additional teacher licensing endorsements, maintenance of classroom websites, additional classroom teacher responsibilities related to special education, and creation of common assessments across courses are all part of a teacher's work-day. We recognize that most of these items have had a positive impact on teaching. However, as a department, we are trying to ask teachers to be open and receptive to change about their teaching practices while not providing them with more time to do so. The most important part of a teacher's job is to prepare and deliver excellent lessons. We need to ensure that teachers have appropriate time to collaborate, discuss best practices, and to reflect upon creating engaging activities for their classrooms. Additionally, it cannot be understated that the continuation of increased demands with parent communication via email and through individual conferences is having a profound effect on our teachers. Teachers' allotted time is being stretched thin. The number of non-productive parent communications also seems to be on a continual rise and addressing them professionally can bring a complete halt to an educator's workday.

There are many things that will impact our program in the coming years that we will have to be prepared to address as they materialize. This is a list, in no particular order, of some items that we know we will have to evaluate:

- It is our sincere hope to have an Elementary Math Specialist in each building along with tutor support to help implement a stronger and better articulated tiered system of support. It will take multiple years of work from many stakeholders to ensure a successful transition.
- We need to identify and implement a mathematics intervention program for our elementary Tiered System of Support.
- Students who enter our system in grade 6 and grade 9 from other schools, public and private, are almost always behind our students in terms of academic achievement. It will be important to consider how we continue to integrate these students into our system so that they can close gaps in their knowledge.
- We no longer have years of institutional norms to fall back upon in regards to MCAS testing results. The content and format of the assessment have changed and we are provided with little reference material to date. It will take time to re-establish our command of the test content.
- Scheduling flexibility is of the utmost importance. All of the principals work hard to create schedules that accommodate the varied needs of our math learners. Their continued cooperation allows us to do our best to help all learners. At the secondary level, where teachers are limited to three class preparations and where we have multiple single section courses, the problem is magnified and scheduling is complex.
- Intervention blocks, advisory periods for students, school trips, and assemblies are all valuable parts of our school district culture. As we look to increase time spent on these activities it will become increasingly more difficult to appropriately teach all of the standards, in particular, prior to MCAS assessments.
- Good teaching happens in good environments. It is becoming increasingly difficult to find quality spaces for teaching mathematics in each building while also preserving common planning time. Mr. Swanson and Mr. Smith went to great lengths to convert computer labs into math teaching classrooms which has had a very beneficial impact on the program.
- We have more students taking 4 years of math now than we have in the past. This is partially due to minimum standards put forth by the Massachusetts State Universities and Colleges. The interpretation of the standard varies from district to district. However, we acknowledge that this is a good outcome for most students. Our interpretation of the standards can be seen in the appendix. (Appendix A-50, 51) We will need to continue to monitor this interpretation to ensure that it holds true in the future.
- We have been able to support sheltering the Computer Science courses within the department and we think that is appropriate. However, we have had to make difficult

staffing decisions to maintain these courses and did not run the Tech Squad class this past school year. In 2020-21, we were forced to not run any computer science courses in order to meet math class size needs for cohorts. The number of students signing up for Intro to Computer Science far exceeds the number we can actually teach at this moment and interest continues to grow as more students are gaining exposure at the elementary and middle school levels.

- We have to evaluate and adjust our current intervention system in place at the middle school. We need to review the curricular approach that we are taking to address student gaps and develop planning around supporting students' success over time.
- Fact fluency is a fundamental skill that can differentiate a student's ability to access and apply mathematical ideas quickly. We are in year 2 with our use of REFLEX math as a tool to use along with our other methods (interviews, flashcards, fast facts) to help improve fluency at the elementary level. We will need to evaluate the impact of that program on student learning over time.
- We are interested in evaluating other districts Gifted and Talented Programs to compare and contrast all of our pathways and opportunities for students.
- There is significant national concern that females are not actively pushed to STEM fields and grow turned off to mathematics during middle school and high school. In 2019, 55% of our Advanced Placement students identified as female. In 2020, 50% of our Advanced Placement students identify as female. It will be important to be mindful of this idea over time to ensure that our program truly supports balance year in and year out.
- Anecdotal data leads us to believe that we currently have a student population that struggles more with perseverance, set-backs, and risk taking. This is tied to stress around performance and expectations. We will have to monitor the effect of the elementary social emotional curriculum as well as the use of the Standards of Mathematical Practice to see if student behavior changes over time.
- In conjunction with the Special Education department we ran after school MCAS prep classes in grades 6-8. They were wildly unpopular and poorly attended. The Director of Mathematics communicated with over 60 families at that time. The resounding themes were, *"It's only middle school MCAS, they don't really matter...It's not worth giving up extra-curricular time for MCAS preparation...I don't want to put that type of pressure on my child simply for a standardized test. They currently feel good about their actual math class...You only care about your MCAS numbers! I care about my child!"* These responses are important reminders to keep in mind when we are planning for and discussing students who have traditionally not performed well on the MCAS.
- We were waiting for recommendations from the NEASC review to address revisiting all of the curriculum guides to ensure that they reflect the changes in the program. We have the ability to make these documents more comprehensive if we deem that to be valuable work. They will need to be reformatted and revised in the next couple of years.

- Our Elementary Math Specialists do a tremendous job of embedding professional development into our program. However, we should be thoughtful of ways in which we can include more elementary staff in external math professional development opportunities.
- As the student population continues to expand, it becomes harder to justify running “singleton” courses such as 6th grade Math Enrichment when regular class sizes increase.
- The Mathematics website needs a complete overhaul so that we can provide more information, guidance, and assistance to students and families.
- The Program of Studies nomenclature needs to be reviewed so that there is consistency from grade 6 through grade 12 in terms of naming courses and levels. This will lessen confusion and allow for clearer articulation of the program.
- It’s only math!!! Some students have zero interest in the topic. We still need to educate these students appropriately but need to continue to be mindful of what makes them happy at school. Having two math classes a day for the sake of an MCAS score or to attempt to close a learning gap can be a short-sighted view point when it comes at the cost of an elective class that can truly excite a child and make them feel more connected to their school community. We need to continue to work with individual families and prioritize an overall education that is best for each child.

COVID 19 RESPONSE

As we shifted to remote learning in March of 2020, the Mathematics Department was in a unique position. We had just finished our third year of a department goal that revolved around infusing more technology in the classroom. This meant various things to each teacher as we all had a different starting point and learning curve. However, we had been participating in professional development, searching for new ways to engage and enhance curriculum through technology, and had been heavily in the practice of peer to peer support and development. As a department, we capitalized on what we had learned and were in a good position to effectively engage students remotely.

We immediately shifted our focus to the curriculum that remained for the 2019-20 school year. In every K-12 course, we made decisions on how to prioritize standards not knowing the pace that we would be able to proceed with. Fortunately most mathematics topics are taught in a cyclical fashion over three years and our consistent vertical articulation of curriculum over the years allowed us to understand the need for introduction, depth, or application of a certain idea. We met as grade and subject level teams to make consistent decisions. We also met with the grade/course that came both previously and after to ensure that we were appropriately accounting for skills to be taught. The impact of the work by the Elementary Math Specialists in this regard cannot be overstated as they drove consistent pacing and instruction in all elementary classrooms across the district. Each grade level/course developed living documents to preserve the decisions that were made for subsequent school years. (Appendix A-52, 53, 54).

To begin the 2020-21 school year, those documents were passed on to the subsequent grade levels. They were reviewed and discussed prior to school opening and then similar pacing documents were developed for the 2020-21 school year. Educators made decisions to focus heavily on the priority standards that endure through multiple years first and then prioritize secondary standards after that. Educators were given multiple opportunities throughout the year to continually revisit, revise, and plan with these documents in mind. (Appendix A-52, 53, 54) These documents will be valuable guideposts for multiple school years. For example, students who are taking Algebra 1 this year may not show real gaps in understanding until they take Algebra 2 two years from now. In conjunction with these efforts, we made a decision to formally assess less, to maximize the instructional opportunities when we had students in front of us, and to leverage the use of digital assessment in a formative fashion. Additionally, we removed some of the cyclical assessments at the elementary level and cancelled midterm and final exams at the secondary level which bought back significant instructional time for all classrooms.

In many classes, the teachers are reporting that they have been able to cover more than they had initially thought. Many courses finished their full curriculum in 2019-20 and will do so again in

2020-21. Between the curriculum coverage and excellent teaching that our students received, the majority of students will begin next year in good standing. We will continue to assess skill retention across the grade levels and will have to address overall gaps as they become apparent. More importantly, we will have to carefully monitor individuals who have developed relative gaps in their knowledge due to hybrid and remote learning. For some students, there was disengagement, others struggled with the learning model, and at the upper secondary level we have noticed a significant issue with students who inappropriately relied on math solving apps while in remote learning only to have returned to the classroom without skills that are commensurate to their assessment performance. We will have structures in place to provide support to students but each individual need will be different. Some students will need quick correction in class, others will need additional math support in Tier 1 and 2 interventions, while some students at the high school level may also need to repeat a course or shift a level. Most importantly as an institution and a department we need to plan our structures so that they allow for flexibility over the next couple of years.

Looking Ahead

As we look forward, it is important for the department to keep a clear focus on educating all students appropriately. We have worked hard to ensure that students have opportunities to learn and be challenged. The overall strength of our program has allowed us to be flexible and to continually try new ways to meet the needs of every student. However, change can have unintended and unforeseeable impacts. Hence, we will continue to be forward thinking and adapt as necessary. Although we have many things to continually work on, the following goals will be key parts of moving the department forward in the coming school years:

1. Implementing a consistent tiered system of support at elementary and middle school levels that entails a structured alignment of staffing and consistent tools used for monitoring and intervention. This is an important long-term goal for the district but also will serve to meet the needs of our response to COVID learning environments.
2. Stabilize a long-term plan for the Computer Science Program at the secondary level that consists of multiple curricular offerings and the staffing to meet the student need.
3. Establishment of a Math Department based website. Major points of focus will be curriculum and placement communication, resources to benefit math learning, and enrichment opportunities for interested students.
4. Exploration and potential development of an accelerated gifted and talented sequence for mathematics learners. This entails exploration of other programs and best practices, identification criteria, curriculum adjustments in both middle and high school, exploring college credit potential for seniors.
5. Make decisions about long-term use of technology in the mathematics classroom. We are at the end of a 3 year department goal of doing this. As we plan a return to a “traditional” teaching atmosphere, what important ideas do we carry forward and what technology do we anticipate needing? The goal is to be more efficient, more engaging, or more effective.
6. Evaluate the Accelerated College Prep Sequence. The changes were met very favorably by students and families. Many more students are reaching higher levels of mathematics. We need to monitor this over time and be mindful of any unintended consequences of the sequence. Mostly we need to be patient and let things play out for a consistent period of time without major change.
7. Determine a solution for the future of our common assessment practices.

Despite the recognition of challenges and concerns for the future, Hingham should be looking forward with confidence. We continue to maintain an exceptional mathematics program where our students flourish. It is because of this strength, not in defense of it, that we are able to be critical of our current accomplishments and plan for continued evolution and improvement for our students.