



**PreK-12 Math Curriculum Review**  
West St. Paul - Mendota Heights - Eagan Area Schools  
School District 197

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Prepared by

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## Background

All students in School District 197 receive instruction in mathematics. Math is one of our four core content areas along with English/Language Arts, Science and Social Studies.

The state of Minnesota adopted Math Standards in 2007 with full implementation by the 2010-11 school year. The standards were set to be reviewed in 2015-16, During the first special legislative session of 2015, this review was postponed until the 2020-21 school year. Full implementation of the new math standards will follow the adoption of the new set of standards. The state of Minnesota has not adopted the Common Core State Standards for Mathematics. Consideration will be given during the 2020-21 review.

We determined that, even though the standards were not going to be reviewed at the state level, we would continue as planned with a local math review. Much work has occurred over the past four years with the middle school and high school. We have added math intervention. We then determined a need for a PreK - 12 math review for a variety of reasons.

Our core resources are over seven years old. Some of our resources are out of print and the online access for our resources has expired and now requires an annual subscription fee. With the addition of 1:1 devices for students in grades three through twelve, we need to assure that our resources are compatible and accessible on these devices. There is also a need to review math acceleration pathways and curriculum.

In preschool through fourth grade, students and teachers use the Everyday Math curriculum resource, published by McGraw Hill. Everyday Math was developed by the University of Chicago Mathematics Project. Everyday Math uses a hands on approach to teaching foundational math skills and reinforcing conceptual understanding of mathematical concepts.

Students and teachers in fifth through eighth grade use Holt Math, published by Houghton Mifflin Harcourt. The Holt Math series is considered to be more of a traditional math instructional tool. Concepts are taught in units and more traditional methods and algorithms are used.

In grades nine through twelve, students have various course options within the math department from Intermediate Algebra through Advanced Placement Calculus. Each course has a curriculum resource aligned to the goals and objectives of the course. Students are required to have three years of mathematics in order to graduate from Henry Sibley High School. Many students choose to take four years of math in high school as most colleges require four years of math for admission.

As a part of the review process in year one, our committee was charged with developing Core Beliefs, Outcomes that Matter to All, and conducting a SWOT (Strengths, Weaknesses, Opportunities and Threats) Analysis. In order to come to a common understanding of best practices in math instruction, the committee participated in professional development at each of our meetings.

In October, we read and studied articles from Stanford University on Brain Science. The topics highlighted in this discussion revolved around how the brain learns math and how that translates into classroom instructional practices.

In December, we discussed enrichment and acceleration in math. We learned about best practices in math according to the National Council of Teachers of Mathematics (NCTM). NCTM is the global leader and foremost authority in mathematics education (NCTM, 2012). As referenced in the acceleration section below, we discussed our current practices and how we could better reflect these best practices.

In January we called on the expertise of Ellen Delaney, a leader in mathematics instruction in Minnesota. Ellen was Minnesota Teacher of the Year and served on the State standards writing committee for the 2007 Standards. She is the former President of the Minnesota Council for Teachers of Mathematics (MCTM). Ellen spent the morning with us reviewing “Best Practices in Math Instruction - Ensuring Success for All Learners.” We had engaging conversations about what the recommendations from NCTM mean for our classrooms. Using these recommendations to guide our curriculum review process will ensure our resources can meet the needs of all learners. Three surveys were sent out following this meeting. We surveyed students in grades three through twelve, parents and teachers.

At our March meeting, the review team dug deep into the survey data from students, parents and teachers. We used the Data Driven Dialogue (“Using Data, Getting Results”, 2002) to process the results of the surveys. The surveys can be found in the Appendix of this report and a summary of the results can be found in the Data Analysis section of the report.

Throughout the year, we involved our Curriculum Advisory Committee, our district administrative team and the school board by sharing updates and opportunities to provide feedback.

### **Math Curriculum Review Team**

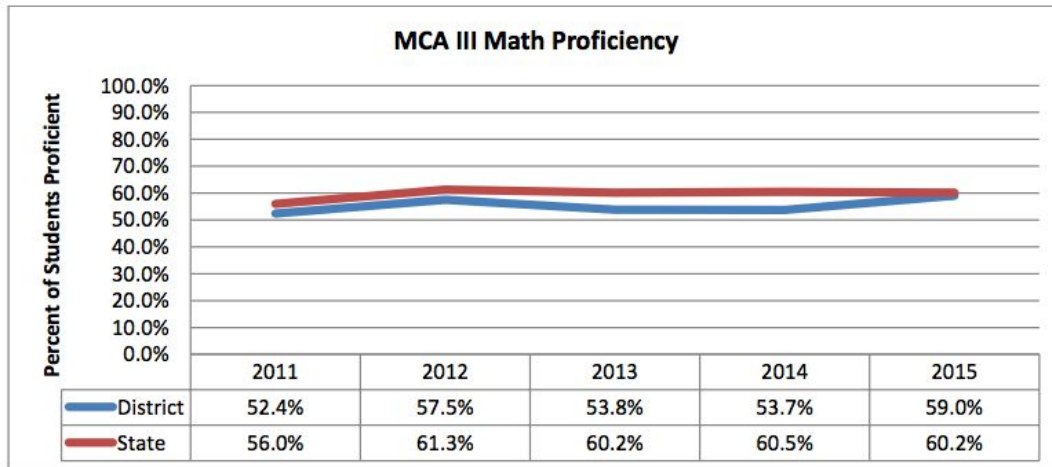
A team of PreK-12 math teachers, coaches, principals, and district office staff was assembled to evaluate the math curriculum as part of year one of the review process. All grade levels and sites are represented on the team. Each member of the team was responsible for going back to their team to share information and gather feedback on what has been shared or accomplished at each meeting. A complete list of team members can be found in Appendix A.

### **Data Analysis**

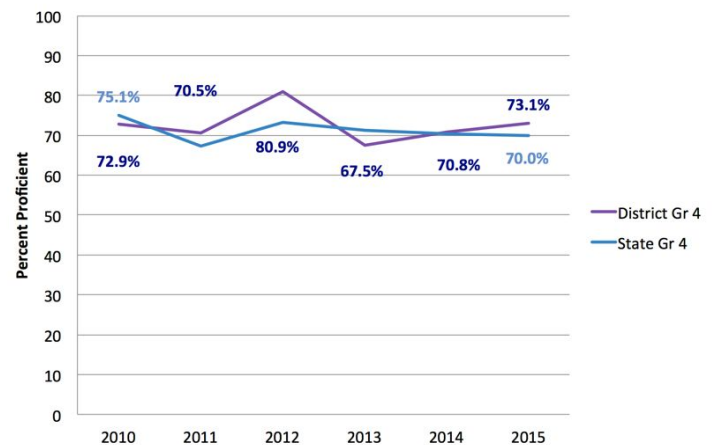
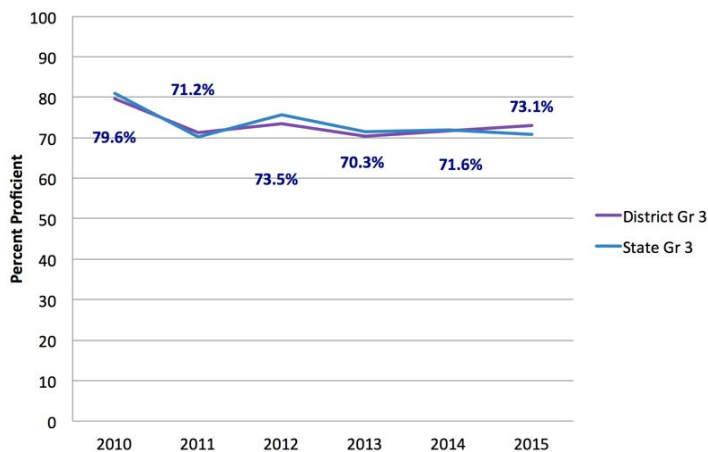
The team analyzed student achievement data, enrollment data, and results of parent, teacher, and student surveys.

#### **Academic Achievement Data**

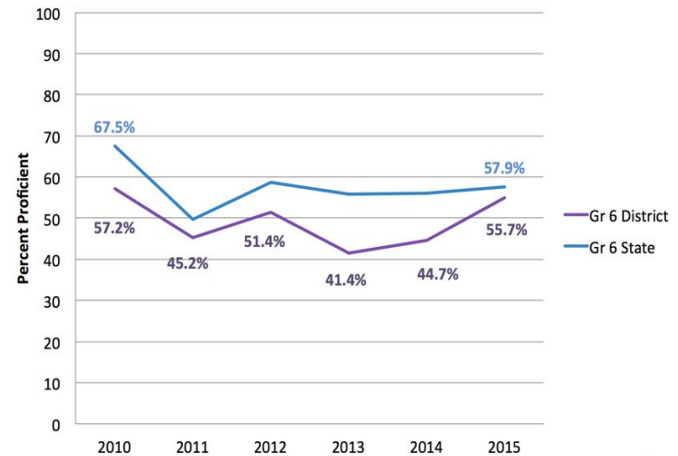
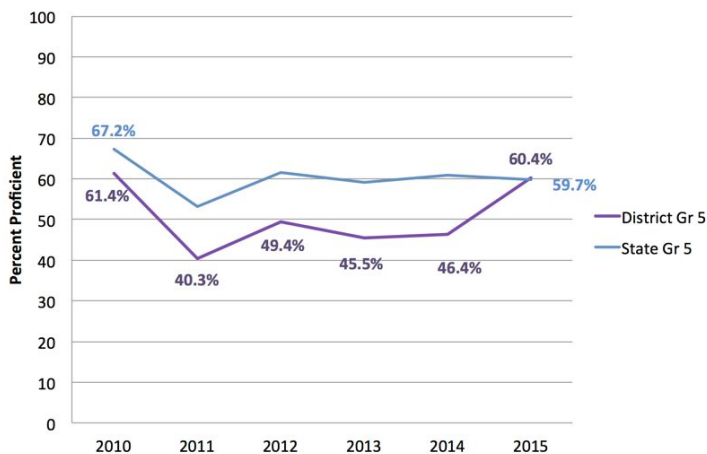
Students in grades three through eight, and grade eleven, take the Minnesota Comprehensive Assessment (MCA) in the spring of the year. The assessment is designed to assess proficiency on grade level standards. Overall, the district performance in math on the MCA over the past five years has risen 6% and still falls slightly below the state average. In addition to the MCA proficiency assessment, we use the Measures of Academic Progress (MAP) to identify students meeting grade level targets and measure growth in math over time.



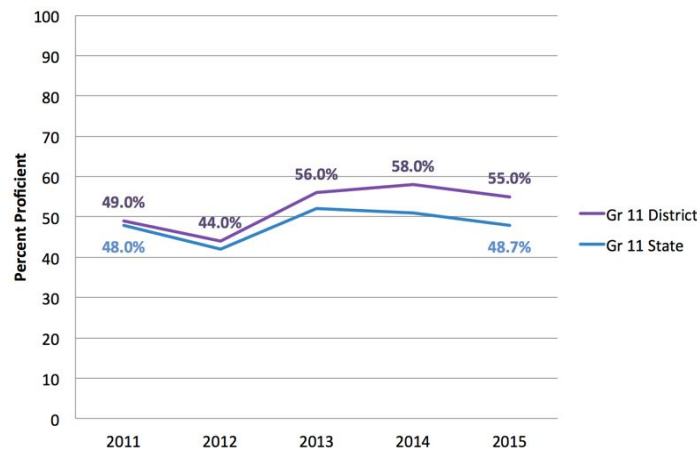
Academic achievement at the elementary has been right around the state average over the last six years with over 70% of students in both grades three and four performing at proficient levels.



Academic achievement at the middle school has been an area of concern for the past few years. Since 2011, the district has seen nearly a 20% drop in proficiency for students as they move from grade four to grade five. This has been an area of intense focus since 2013. In the spring of 2015, the district saw a 13% increase in grade five achievement from 2014, and 11% in grade six. Similarly, the district saw an 11% increase at grade seven in the spring of 2015 while grade eight saw only a 2% increase in proficiency.



While the MCA math test is given at all grade levels in the middle school, it is only given in grade eleven at the high school. The test in grade eleven assesses standards through the District Algebra 2 course. Students at the high school continue to score above the state average.



## Enrollment Data

The review team spent time looking at enrollment data for the middle school and high school. We looked for trends in enrollment over time. Data used in this review can be found in Appendix B.

Students at the middle school are placed into their middle school math course. Currently, acceleration does not traditionally begin until grade seven for students. Students in grades five

and six are placed in either their grade level math course or an enriched course. Over the past two years, approximately 30% of student enrolled in enriched math.

Students in grade seven are enrolled in Math 7, Enriched Math 7 or Algebra 7. Algebra 7 is a full grade level accelerated math course. Over the past two years, the average enrollment in Enriched Math 7 has been at 15%, while Math 7 is at 69% and Algebra 7 is at 16%. Enrollment in math courses in grade eight have varied over the past four years. Recently, we have worked to provide consistency in offerings and entrance criteria. Students in grade eight may enroll in Linear Algebra, Algebra, Enriched Geometry or Enriched Algebra 2. For the current school year, 59% of students in grade 8 are enrolled in Linear Algebra, while 24% are enrolled in Algebra, 16% in Enriched Geometry and 1% in Enriched Algebra 2. The procedures for acceleration were discussed by the team and are outlined below in the Acceleration section of the report.

As we looked at high school course enrollment, we looked for trends in enrollment in advanced and intervention courses over time. On average approximately 30 - 35% of students enter grade 9 in an accelerated math course. With the addition of intervention math three years ago, we see, on average, 25 - 30% of students needing some sort of intervention math course. We continue to evaluate our course offerings for incoming students.

We offer three Advanced Placement courses in math, AP Computer Science, AP Calculus AB and AP Calculus BC. Due to enrollment, AP Computer Science is generally offered every other year. AP Calculus AB has been offered every year and there are generally two sections of the course. AP Calculus BC has also been offered every year and there is generally just one section.

For high school course details, please see the high school math pathway and course descriptions in Appendix C.

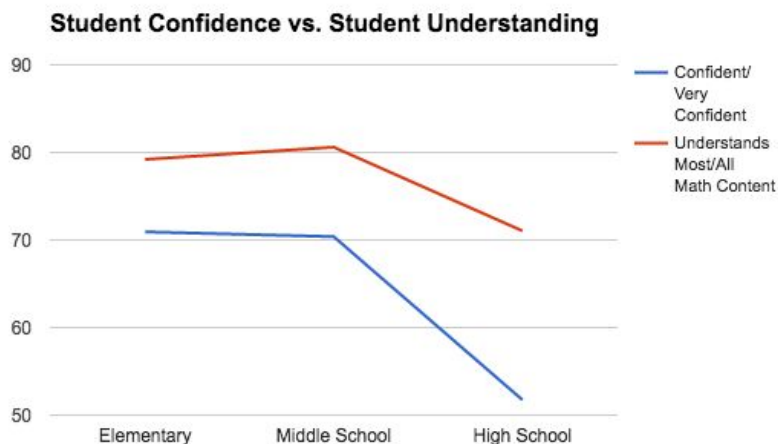
## **Survey Data**

The math review committee created three surveys - student, parent and teacher. Information gathered from the survey will guide the work our committee does in year two of our curriculum

review. Included below are some notable results from each survey. All three surveys are included in Appendix D.

### Student Survey Results:

We asked students in grades three through twelve questions about how they experience math, how much and what kinds of homework they have as well as their confidence level in math. We found that the gap between a student's confidence level and their perceived achievement in math widened as they went up in grade level.

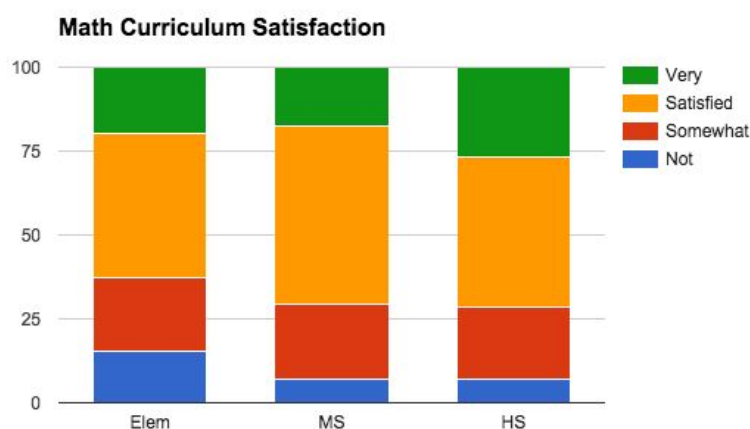


Students also identified that practice problems, group/partner work and computer/iPad practice help them learn concepts best.

An interesting observation from the survey data was that students in elementary and middle school rated activities involving technology, such as practice games and projects, much higher than our high school students. The review committee inferred that this is due to students in the elementary and middle school having had technology as a part of their learning on a more consistent basis than those in high school.

### Parent Survey Results:

The parent survey was developed with the intention of getting feedback from parents about how they experience math at home with their child. We also wanted to provide an opportunity for parents to tell us what they want us to look for in curriculum





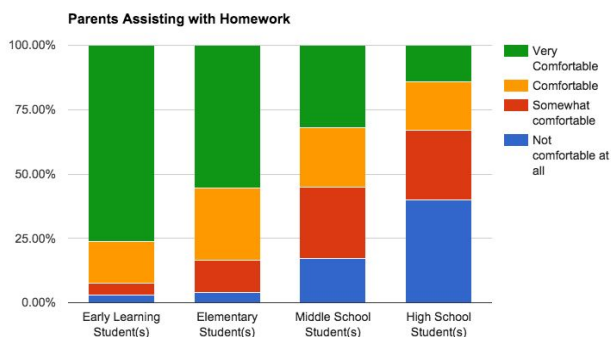
resources. The survey was sent via email in English and Spanish as well as paper for buildings who requested a paper version. We had 351 parents respond to the survey.

Overall parents are satisfied with our curriculum resources. In contrast, parents shared that they

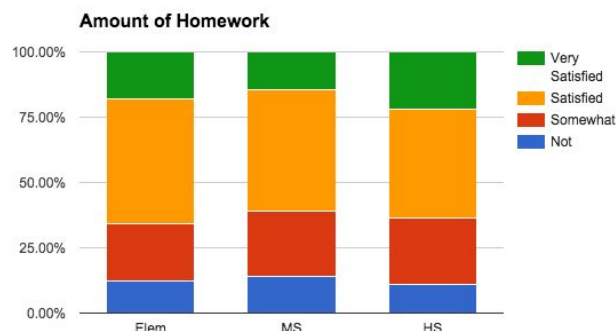
do not feel there are adequate resources for

parents to help their students with math at home.

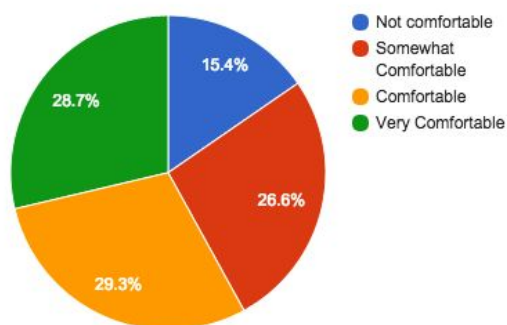
As predicted by the review team, as students move up in grade level, parent confidence level in helping students at home decreases. This came through in both the quantitative question about support materials and again in comments made by parents.



When it came to homework, a majority of parents were satisfied with the amount and types of homework. Comments were mixed in favor of less homework and more homework than currently given. Responses about the rigor of homework were also mixed. Some called for more rigorous, challenging homework. Others commented on a desire for homework that involves practice of concepts already mastered that do not require a substantial amount of parental support.



**Comfort with Digital Math Curriculum**



We also asked parents about their comfort level of having digital curriculum resources in math. We found that 58% of 339 parents who answered this question were either comfortable or very comfortable with the transition to digital math curriculum. Comments on this topic varied as well. Many parents

appreciated having access to digital curriculum resources at home to assist students in mastering mathematical concepts.

An additional concern that was noted in many parent comments was the transition for students from elementary math to middle school math. The change in resources and methodology creates a difficult transition for our fifth graders, especially.

#### Teacher Survey Results:

The teacher survey was sent to all teachers in the district who teach math including special education and English as a Second Language (ESL). Teachers were asked to share the amount of time spent on math in the classroom, types of activities used to teach math, and the overall strengths and weaknesses of current curriculum resources. Of the 79 teachers who completed the survey, 59 were from the elementary setting.

Some of the strengths and weaknesses identified are displayed in the chart below.

Strengths	Weaknesses
<ul style="list-style-type: none"><li>• Games in Everyday Math (EM)</li><li>• Hands-on activities (EM)</li><li>• Math Boxes as a review (EM)</li><li>• Varied levels of homework with HOLT (MS)</li><li>• Use of manipulatives (EM)</li><li>• Online access to textbook (All levels)</li><li>• High School level: Aligns well with MN state Standards and good problem sets (not Holt)</li></ul>	<ul style="list-style-type: none"><li>• Not fully aligned to MN grade-level State Standards (often lessons are exposure to future grade-level standards) (EM)</li><li>• Homework relies heavily on family support (EM)</li><li>• Lack of fact practice and general number sense (EM)</li><li>• Holt (middle and high school) - Not enough practice problem sets to understand the concepts well</li></ul>

In reviewing these results, we found that there were mixed reviews on Everyday Math from our elementary staff. Some saw the spiral nature of the curriculum as a strength and others saw it as a weakness, particularly for students in Special Education and ESL.

We also found that there are discrepancies in how much time is being spent on math in the classroom. At the secondary level, this is more consistent as they have a certain period of time dedicated to a math course. At the elementary level, we found teachers are spending anywhere from 30-90 minutes on math on an average day with the majority of teachers setting aside 60 minutes for math daily.

Over 60% of teachers stated that they do not feel they have adequate resources to meet the needs of all students in their classrooms. Teachers shared a desire for additional resources such as:

- Updated curriculum resources
- Manipulatives
- Options for differentiated resources
- Technology resources (adaptive math programs)
- Professional development of best practices in teaching math

We also asked math teachers about the use of technology in teaching math. We found that use of technology was greater at the elementary and decreased as the grade level increased. Examples of technology used in classrooms include: iXL, Kahn Academy, Explain Everything, NearPod, Sumdog, Kahoot, SeeSaw, Google Classroom, Flipped Classroom, and QR codes to access tutorials.

	Elementary	Middle School	High School
<b>Daily</b>	71%	60%	40%
<b>Weekly</b>	25%	33%	0%
<b>Monthly</b>	3%	0%	20%
<b>Few Times a Year</b>	0%	0%	40%
<b>I do not use Tech</b>	0%	6%	0%

Teachers also shared that some areas they would like to see more professional development include:

- Strategies for re-teaching and differentiation
- Technology integration into math content
- Vertical alignment of standards, skills and curriculum
- On-going development of best practices in teaching math

## Core Beliefs

### We believe:

- All students will have equitable access to high-quality curriculum, instruction, and supports to be successful on a preK-12 math pathway.
- All students should have consistent experiences in math instruction, aligned to the district scope and sequence.
- Math builds abstract and higher levels of thinking so individuals can persevere and develop the ability to self-assess.
- Mathematical understanding helps build connections to life experiences through problem solving that enable students to explain their thinking.
- Cooperative learning experiences will foster the collaborative skills needed for future success.
- Every student should be held to high expectations and instructed by highly qualified teachers.
- All students can learn math through the fostering of a growth mindset.
- All students should develop deep mathematical understanding through an environment that encourages discussion and questioning.
- High quality instruction is differentiated and guided by math standards as well as a variety of formative and summative assessments.
- Students develop mathematical understanding through a variety of learning activities which include: interdisciplinary, hands-on, and real life experiences.
- It is essential that students are provided multiple opportunities and support to understand and learn from their mathematical conceptual mistakes.
- Home and family involvement will foster growth by reinforcing concepts, encouraging students, and providing other pathways for students to explain their learning.

- There are mathematical skills, concepts, and common academic vocabulary that build a solid foundation learned in early grades.
- Students learn reasoning and explaining skills from consistent and meaningful mathematical discourse.
- Students need to model mathematical concepts and use tools strategically.
- Technology connects to and enhances math instruction, assessment, and learning.
- Technology can be used to personalize learning.
- Technology should be used in balance with other instructional methods.
- Technology can assist students to enrich/expand mathematical understanding while showing connections to real-world application.

## Outcomes that Matter to All

**Mission (Our Core Purpose)** School District 197 provides a challenging educational environment that instills in each student a lifelong passion for learning, empowers all students to achieve their personal goals and academic potential, and prepares them to be responsible citizens in an interconnected world.

**When our work aligns with our Core Purpose, we will produce Outcomes That Matter To All:**

- Students will be able to graduate college and career ready.
- Students will be able to think flexibly about and represent mathematical concepts and numbers in many ways.
- Students will be able to use technology to enhance problem solving skills.
- Students will be able to demonstrate their understanding verbally, graphically, visually and mathematically.
- Students will be able to persevere to effectively solve problems using various tools.
- Students will be able to make connections among and between mathematical concepts.
- Students will be able to ask questions to deepen mathematical understanding.
- Students will be able to have a growth mindset and build confidence.
- Students will be able to use logical reasoning and critical thinking to guide decision making.
- Students will be able to collaborate with others to apply mathematical concepts and solve real world problems.

## SWOT Analysis

After completing the data analysis, the review committee completed a SWOT analysis for math programming in School District 197 which identified Strengths, Weaknesses, Opportunities, and Threats. Here you will find a summary of our SWOT Analysis. You can view the entire analysis in Appendix E.

### Strengths

We have passionate and committed math teachers. We have a district-wide focus on improving math learning opportunities for our students. The middle school grade levels (5-8) have a common scope and sequence and have begun the process of developing and using common assessments. Another strength is that we have multiple opportunities for students to excel in math all the way up to AP Calculus in high school. Access to technology was also identified as a strength in our school district. Although new in many of our schools, teachers have access to technology tools to enhance learning in mathematics.

### Weaknesses

We have some disparities in the demographics of students in our advanced level courses. As we have developed intervention courses in mathematics, we find a large number of Special Education and ESL students in those courses as well as a large number of students of color.

The transition from elementary to middle school has been a weakness that seems to have been caused by the differences in curriculum resources and support. Students in the elementary level have been working with various methods to solve a problem. Some of these methods will not solve the problem as quickly. In the middle school, students are asked to solve problems using a more traditional algorithm. The transition between elementary and middle school needs to be evaluated as do the curriculum resources used at each level.

Parents who completed the survey overwhelmingly stated that there are not enough resources for parents to help their students with math. In addition, the review committee felt we need to do a better job as a district communicating with parents about math such as how to help with math,



where to find resources, and what supports are available for students in school (intervention or advanced studies).

### Opportunities

Some opportunities the review committee would like to explore include the development of some career related field experiences for students. The committee also felt that looking at how we can support students outside of class time would be an opportunity to increase achievement in math. This may include Spring/Winter Break, before/after school, and summer school time.

### Threats

The threats identified included state mandated testing in math, funding limitations in terms of support provided for students in math, and the availability of math resources in other languages.

## **Acceleration**

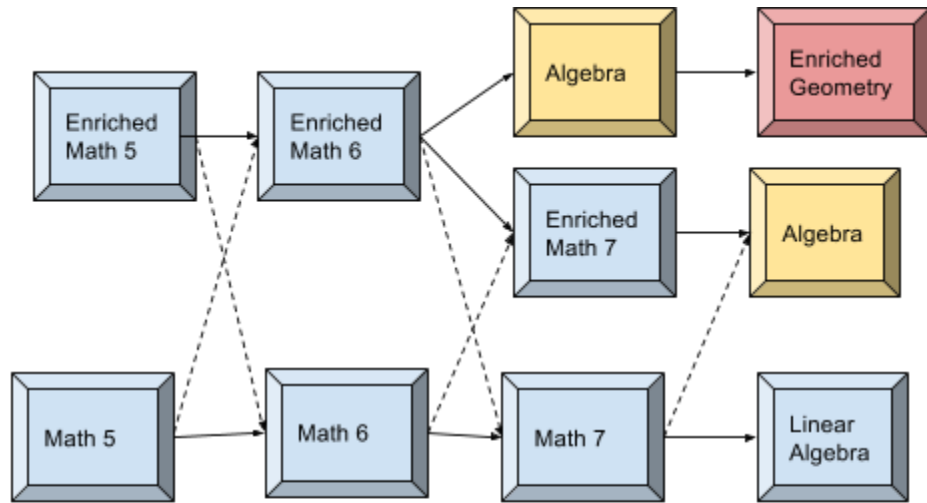
We reviewed the current practices and acceleration paths for students. Through these discussions, it was apparent that opportunities for acceleration have varied over the past five years. The committee investigated best practice in acceleration and enrichment by reviewing articles from experts in the field. The committee then discussed what we would like to see in acceleration pathways for students. In January, we spent a significant amount of time with Ellen Delaney discussing our acceleration practices and how we could provide access at the appropriate time for kids. Following our discussion with Ellen, we have developed the following recommendations. Further vetting of the recommendations will take place this spring and an implementation timeline will be developed that allows for curriculum development and resource allocation.

### Recommendations:

- Provide for full grade level acceleration in math beginning in at least grade five.
- Maintain the enriched options in grade 5, 6 and 7 for students who are not quite ready for full grade level acceleration.
- Allow multiple entry points into acceleration.
- Add an assessment that considers a student's' readiness for algebra.

- Consider giving high school credit for successful completion of Algebra course.
- Provide for compacted curriculum versus completely skipping one grade level of standards (current pathway has students skip grade seven standards).
- Provide a visual representation of pathway options for parents, students and staff.

Current Middle School Pathways



- dashed lines represent possible pathways
- solid arrows represent most common pathway
- yellow shaded boxes represent the same course which covers both 8th linear algebra standards and the standards in the 9th grade intermediate algebra course
- red shaded boxes indicate course where high school credit is given

## Next Steps

In year two of curriculum review, the committee will look at math curriculum resources used in comparable districts to identify what resources we evaluate for our own district resources. We will look at both print and digital resources in order to create a meaningful learning experience for all students in math.

We will create a Pre K-12 scope and sequence as well as develop a model lesson plan for use in math classrooms taking into consideration Personalized Learning and digital resources. We

will develop a professional development plan for all teachers of math that provides for best practice in math instruction as well as supports for the new resources.

As we review new resources, we will ensure we look at them through the lens of a parent and what resources are available. We will solicit feedback from our parent groups to ensure we are providing adequate support for all groups of parents.

We will also conduct further vetting of our acceleration recommendation to ensure it is meeting the needs of students in need of additional rigor in math.

## Appendix A

### Math Curriculum Review Team

Team Member	Position, Site	Team Member	Position, Site
Hope Alger	7th grade, Friendly Hills	Erik Kluznik	Henry Sibley
Karen Allen	Principal, Heritage	Sara Lein	Assistant Director of Special Programs
Michelle Bannie	3rd grade, Somerset	Angela Lewis	5th grade, Friendly Hills
Emily Dauk	Henry Sibley	Dee Locke	Math Coach, Moreland
Jessica Deegan	8th grade, Heritage	Andrea Munson	2nd grade, Mendota
Sarah Egberg	ESL & Equity Coordinator	Jeff Nisbet	Henry Sibley
Jess Emery	ESL, Henry Sibley	Aimee Noeske	Henry Sibley
Tony Gatti	Special Education, Henry Sibley	Mark Quinn	Principal, Moreland
Rick Halley	Gifted and Talented Coordinator	Stacy Schuessler	Kindergarten, Moreland
Dawn Halverson	Special Education, Moreland	Kate Skappel	Curriculum Coordinator
Chris Hiti	Principal, Friendly Hills	Kelsey Thornton	ESL, Garlough
Scott Karlen	Associate Principal, Henry Sibley	Jennifer Watterson	Community Preschool
Christine Kelly	Math Coach/8th grade, Friendly Hills	Heather Wilsey	1st grade, Garlough
Cari Jo Kiffmeyer	Director of Curriculum, Instruction and Assessment		

## Appendix B

### Course Enrollment: Middle School and High School

#### Middle School Course Enrollment

	2012-2013 # of students		2013-2014 # of students		2014-2015 # of students		2015-2016 # of students	
Course	FHMS	HMS	FHMS	HMS	FHMS	HMS	FHMS	HMS
Math 5	169	150	167	158	89	182	89	108
Enriched Math 5					88	24	81	62
Math 6	111	135	132	118	119	140	108	166
Enriched Math 6	34	41	64	31	45	30	86	37
Math 7	97	160	85	163	82	154	98	140
Enriched Math 7				23	30	28	24	21
Algebra 7	44	48	56		53	7	33	16
Linear Alg	55	105	66	120	61	156	72	135
Algebra 8	54	18	54	26	53	21	54	38
Geometry	54	25	39 (3 Sib)	40	54	4 (Sib)	49	6 (Sib)
Enriched Alg 2						1 (Sib)		2 (Sib)

#### Middle School Intervention Enrollment

In 2015-16, we moved to a tiered approach in math intervention. Tier 1 is considered core classroom instruction that all students receive. Tier 2 students perform just below grade level and Tier 3 students perform significantly below grade level. Time on intervention, curriculum resources and assessments vary based on the level of intervention needed. Intervention at the middle school level is in addition to students' grade level math course.

	2013-2014 # of students		2014-2015 # of students		2015-2016 # of students	
Course	FHMS	HMS	FHMS	HMS	FHMS	HMS
Grade 5 Math Intervention	48	79	13	60	14	23
Grade 6 Math Intervention			46	36	34	57

Grade 7 Math Intervention					25	50
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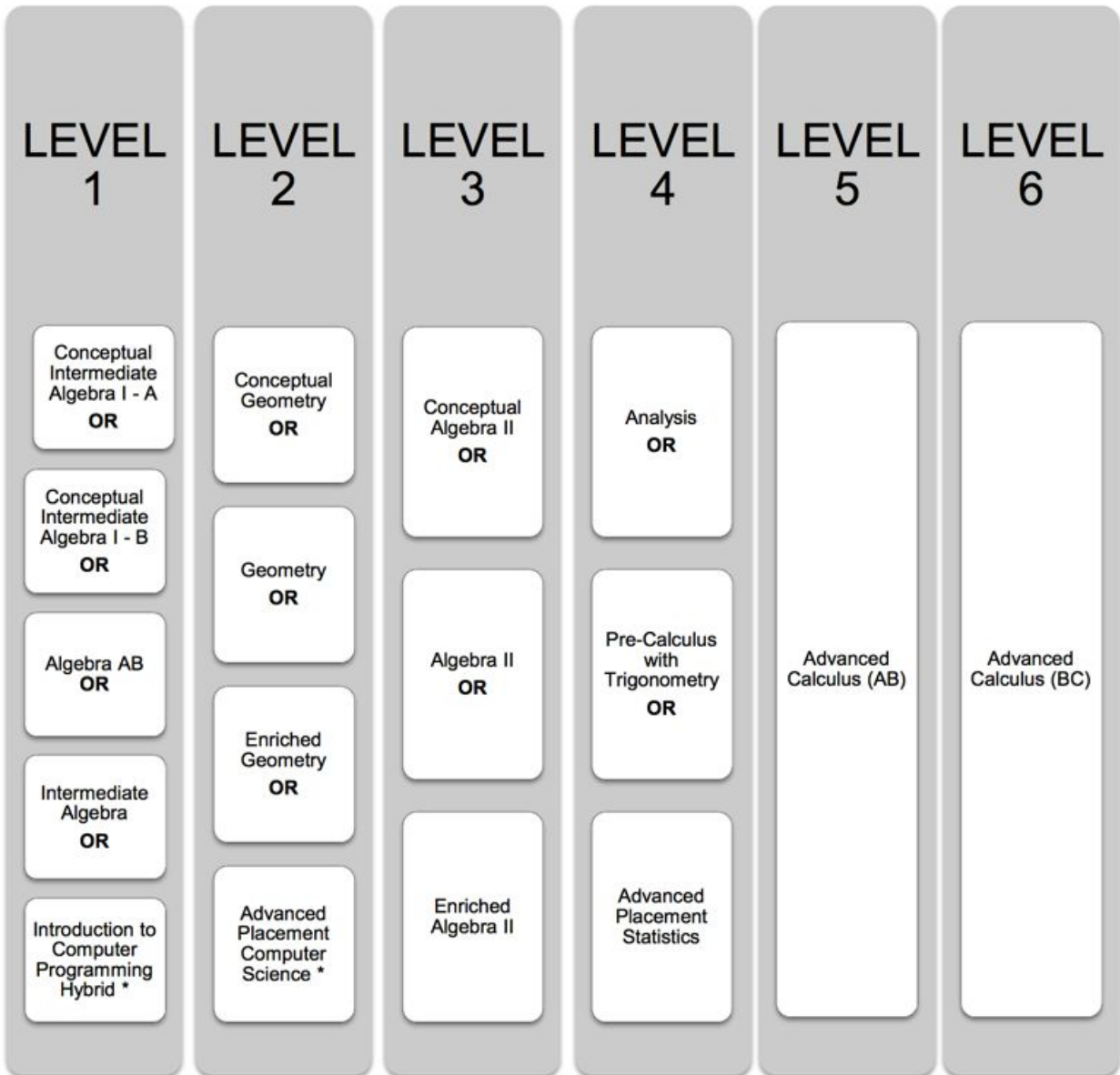
### High School Course Enrollment:

Course	2012-2013 # of students	2013-2014 # of students	2014-2015 # of students	2015-2016 # of students
Conceptual Algebra A*			41	55
Conceptual Algebra B*				21
Algebra AB*		65	58	72
Intermediate Algebra	198	198	157	177
Conceptual Geometry	45	46	54	50
Geometry	198	160	174	167
Enriched Geometry	33	51	45	21
Conceptual Algebra II*	49	50	33	48
Algebra II	167 (Adv Alg)	196	170	193
Enriched Algebra II	124	102	112	93
Math Analysis	106	101	131	110
Pre-Calculus	105	104	81	122
Intro Computer Programing	19	23		21
AP Statistics	16	43	59	26
AP Computer Programming	10		15	18
AP Calculus AB	61	57	57	53
AP Calculus BC	11	19	19	22

\* Denotes an intervention level course

**Appendix C**  
**High School Pathway (from Sibley Registration Guide)**

# MATHEMATICS



## Appendix C (continued)

### High School Course Descriptions (from Sibley Registration Guide)

# MATHEMATICS

**0403, 0404 – CONCEPTUAL INTERMEDIATE ALGEBRA I - A**  
**Full Year – 1 credit – Grade 9**  
 This course will teach students to use expressions, equations, and inequalities to model real-life situations and to solve problems. They will graph, compare and solve computations, using formulas, ratios, rates, and percent. They will learn to write, solve and graph functions, equations, and inequalities in real-life applications. To best support individual student needs, a student may be placed in this course by administration.  
**Homework Guide = 2**

**0405, 0406 – CONCEPTUAL INTERMEDIATE ALGEBRA I - B**  
**Full Year – 1 credit – Grade 10**  
 This course will teach students to simplify expressions using exponents, to graph exponential functions, to evaluate square roots and simplify radicals, graph quad functions. This course will work with polynomials, solve proportions and simplify operations of radical expressions, graph square root functions and solve radical equations. This course will also investigate displays, data, probability and odds. To best support individual student needs, a student may be placed in this course by administration.  
**Homework Guide = 2**

**0407, 0408 – ALGEBRA AB**  
**0409, 0410**  
**Full Year - 1 credit - Grade 9**  
**1 Math credit Grade 9 & 1 Elective credit Grade 9 (register for all four)**  
 The Algebra AB course is designed for ninth grade students needing math support. Placement in the Algebra AB is based on math test scores and teacher recommendation. This course will meet two hours daily with additional mathematical skill building including guided and independent practice. The course will include the study of real numbers and their properties, solving linear equations with one and two variables; graphing; radicals and applications in word problems, the study of real numbers systems, operations with polynomials, linear and quadratic equations and inequalities, functions, stats and probability and radicals. Students will receive both an elective and a math credit. To best support individual student needs, a student may be placed in this course by administration.  
**Homework Guide = 2**

**0411, 0412 – INTERMEDIATE ALGEBRA**  
**Full Year - 1 credit - Grade 9-12**  
 This course includes the study of the real number systems, operations with polynomials, linear and quadratic equations and inequalities, functions, stats and probability, and radicals.  
**Homework Guide = 3**

**0453, 0454 – INTRODUCTION TO COMPUTER PROGRAMING HYBRID**  
**Full Year - 1 credit - Grade 9-12**  
 This introductory course will emphasize the essential of designing and implementing computer programs. The curriculum will include basic algorithms, data structures, and the syntax of the Python programming language. The second semester will introduce object-oriented programming. Every student in the course will receive an electronic copy of the source test, other programming manuals and tutorials, and all of the software required to develop complete Python programs for Windows, Linux, or MacOS.  
**Homework Guide = 3**

**0439, 0440 – CONCEPTUAL GEOMETRY**  
**Full Year - 1 credit - Grade 9-12**  
**Prerequisite:** Intermediate Algebra or teacher recommendation  
 This course integrates synthetic, coordinate and transformational geometry while continually reinforcing algebra skills. Topics included are measurement formulas, three dimensional figures, congruence and transformations, similarity, and proof. To best support individual student needs, a student may be placed in this course by administration.  
**Homework Guide = 3**

**0441, 0442 – GEOMETRY**  
**Full Year - 1 credit - Grade 9-12**  
**Prerequisite:** Intermediate Algebra or equivalent. Guideline: "C" or above OR teacher recommendation.  
 This course integrates synthetic, coordinate, and transformational geometry while continually reinforcing algebra skills. Topics included are: measurement formulas, three dimensional figures, congruence and transformations, similarity, and proof.  
**Homework Guide = 3**

**0451, 0452 – ENRICHED GEOMETRY**  
**Full Year - 1 credit - Grade 9-10**  
**Prerequisite:** Algebra I or equivalent. Guideline: "A-" or above in Algebra I or teacher recommendation.  
 This course includes the same topics as the other geometry course, but with a greater emphasis on deductive reasoning and challenging problems. Students will gain a solid background in right triangle trigonometry and its applications. Each student will design a trigonometry project and carry out the work using a clinometer and tape measure. Enrichment topics such as artwork and design will be integrated with transformations and measurement. Students will be exposed to math team geometry problems on a regular basis. A graphing calculator TI-83 or IT-84 will be required.  
**Homework Guide = 4**



**0457, 0458 – ADVANCED PLACEMENT  
COMPUTER SCIENCE**

**(Computer Programming in Java)**

**Full year - 1 credit - Grade 10-12**

**Prerequisite:** Algebra II.

**Guideline:** Algebra II.

This course emphasizes programming methodology and procedural abstraction. It also includes the study of algorithms, data structure, and data abstracts to write logically structured well-documented programs. The following topics are covered: block structured programming languages, data structures, computer systems, algorithms, programming methodology, and responsible use of computer systems. Students are expected to take the AP Exam.

**Homework Guide = 4**

**0417, 0418 – CONCEPTUAL  
ALGEBRA II**

**Full Year - 1 credit - Grade 12**

**Prerequisite:** Intermediate Algebra and Conceptual Geometry or teacher recommendation.

This course includes the study of the real number systems, operations with polynomials, linear and quadratic equations and inequalities, functions, radicals, progressions and series, logarithms, and matrix operations. To best support individual student needs, a student may be placed in this course by administration.

**Homework Guide = 3**

**0421, 0422 – ALGEBRA II**

**Full Year - 1 credit - Grade 9-12**

**Prerequisite:** Algebra I and Geometry or teacher recommendation. **Guideline:** "C" or better.

This course includes the study of real and complex numbers systems, linear and quadratic equations and inequalities, functions, radicals, conic sections, progressions and series, logarithms, and matrix operations.

**Homework Guide = 4**

**0431, 0432 – ENRICHED ALGEBRA II**

**Full Year - 1 credit - Grade 9-12**

**Prerequisite and Guideline:** Enriched Geometry with a grade of "C" or better, a grade of "B" or better in Algebra and Geometry and/or teacher recommendation.

In addition to extending all topics covered in the Algebra I course, this course includes quadratic functions, relations and systems; exponential functions and logarithms; sequences and series; operation and use of matrices. This course will also include trigonometry, functions in trigonometry, trigonometric identities and formulas. Circular functions and their inverses will be introduced. For a complete trigonometry course a student would be expected to continue in our advanced mathematics sequence with Pre-calculus. **A graphing calculator is required.**

**Homework Guide = 4**

**0461, 0462 – ANALYSIS**

**Full Year - 1 credit - Grade 11-12**

**Prerequisite:** Geometry and Algebra II.

**Guideline:** "C" or better or teacher recommendation.

Analysis is an advanced study of functions, radicals, conic sections, complex numbers, inequalities, analytic geometry, logarithms, matrix operations, progressions, series, and trigonometry.

**Homework Guide = 3**

**0471, 0472 – PRE-CALCULUS**

**Full Year - 1 credit - Grade 9-12**

**Prerequisite:** Enriched Algebra II

**Guideline:** "C" in Enriched Algebra II or better or teacher recommendation.

The focus of Pre-Calculus will be to prepare students for college level calculus. This preparation will involve a concentration on functions and their graphs, trigonometry, and analytic geometry. In all topic areas the vocabulary, notation, and general approach used in a college calculus course will be emphasized. **A graphing calculator is required, TI-83, or TI-84.**

**Homework Guide = 4**

**0463, 0464 – ADVANCED PLACEMENT  
STATISTICS**

**Full Year - 1 credit - Grade 11-12**

**Prerequisite and Guideline:** "B" or better in Algebra II, and/or "C" or better in Enriched Algebra II, or teacher recommendation.

Students will learn techniques used in descriptive statistics emphasizing measures of location and dispersion, rules of basic probability and the properties of probability distributions, the importance of random sampling, and the techniques of basic inferential statistics: hypothesis testing, correlation and regression.

**NOTE:** This course is an advanced level course that is the equivalent to a Statistics I course in college. The pace is that of a college course. **Students are expected to take the AP Exam. A TI-83+ or TI-84 graphing calculator is required.**

**Weighted Grade, 1.2 multiplier.**

**Homework Guide = 4**

**0481, 0482 – ADVANCED PLACEMENT  
CALCULUS (AB)**

**Full Year - 1 credit - Grade 9-12**

**Prerequisite:** Pre-Calculus or teacher recommendation. **Guideline:** "C" or better in Pre-Calculus.

Students will develop an understanding of the concepts, methods, and applications of calculus. The concepts, problems, and applications will be represented graphically, numerically, analytically, and verbally. The course is a unified study of functions, derivatives, integrals, limits, approximations, applications, and modeling. Students who successfully complete the course an AP examination may receive college credit, advanced placement, or both (according to each institution's individual policy). Students will be expected to take the AP Exam. A graphing calculator is required, preferably a TI-83+, TI-84+, or TI-89. **Students are reminded to check prerequisites carefully and obtain teacher signature.**

**Weighted Grade, 1.2 multiplier.**

**Homework Guide = 8**

**0483, 0484 – ADVANCED PLACEMENT  
CALCULUS (BC)**

**Full Year – 1 credit – Grade 9-12**

**Prerequisite:** AP Calculus (AB), "C" or better or teacher recommendation.

This course is a further study of Calculus topics in preparation for the AP Calculus BC exam. It is the equivalent of a second semester of college level Calculus course.

The course will extend the concepts of differentiation and integration established in the prerequisite AP Calculus BC course.

In addition, the content will include parametric equations and polar coordinates as well as an in depth exploration into series and sequences.

Students will be expected to take the AP Exam. A graphing calculator is required, preferably a TI-83+, TI-84+, or TI-89.

Students are reminded to check prerequisites carefully and to obtain teacher signature.

**Weighted Grade, 1.2 Multiplier**

**Homework Guide = 8**

## **Appendix D**

### **Survey Questions**

## School District 197 Math Curriculum Parent Survey

1. Rate your current satisfaction with the following components of math instruction for your **ELEMENTARY** student.

If you do not have an elementary student please move to the next question.

	Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied	N/A
Curriculum (Everyday Math)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content of homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support material for parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Additional support for students outside of the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Comments

3. Rate your current satisfaction with the following components of math instruction for your **MIDDLE SCHOOL** student.

If you do not have a middle school student please move to the next question.

	Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied	N/A
Curriculum (Holt Math)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content of homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support material for parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Additional support for students outside of classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### 4. Comments

#### 5. Rate your current satisfaction with the following components of math instruction for your **HIGH SCHOOL** student.

If you do not have a high school student please move to the next question.

	Not Satisfied	Somewhat Satisfied	Satisfied	Very Satisfied	N/A
Curriculum Materials (Textbook, Online resources)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Amount of homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Content of homework	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Support material for parents	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Additional support outside of the classroom	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

#### 6. Comments

#### 7. Please indicate the grade level of each of your children, what, if any special services they receive and on average how many minutes of math homework they have each night.

	Grade	Special Services	Time spent on MATH homework DAILY	Amount of MATH homework
Student 1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Student 2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Student 3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Student 4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Student 5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Student 6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

\* 8. Rate how comfortable you are helping your child with math at home.

	Do not have a student at this level.	Not comfortable at all	Somewhat comfortable	Comfortable	Very Comfortable
Early Learning Student(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Elementary Student(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Middle School Student(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High School Student(s)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Comments

10. One of our goals is to transform teaching and learning through the use of technology. What is your comfort level with moving to a digital math curriculum?

Not comfortable at all	Somewhat comfortable	Comfortable	Very comfortable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Do you feel our math curriculum is preparing students for college or career?

☐ Not Prepared ☐ Prepared ☐ Very Well Prepared

12. Tell us why you chose your answer for question #11.

13. What comments do you have for our curriculum review committee as we look at math curriculum resources?

\* 14. What language is mainly spoken in your home?

## Math Curriculum Review Teacher Survey

1. What grade level(s) do you teach?

- ☐ Preschool
- ☐ Kindergarten
- ☐ First Grade
- ☐ Second Grade
- ☐ Third Grade
- ☐ Fourth Grade
- ☐ Fifth Grade
- ☐ Sixth Grade
- ☐ Seventh Grade
- ☐ Eighth Grade
- ☐ Ninth Grade
- ☐ Tenth Grade
- ☐ Eleventh Grade
- ☐ Twelfth Grade

2. On average, how much daily math homework do students typically have from your class?

- ☐ None
- ☐ 5-15 min.
- ☐ 20-30 min.
- ☐ 30-45 min.
- ☐ 45-60 min.
- ☐ More than an hour

3. What kinds of Math homework do you give in your classroom?

- ☐ Practice problems from that day's lesson.
- ☐ Practice problems from a previous lesson.
- ☐ Individual Projects
- ☐ Group Projects
- ☐ Educational Games (iXL, SumDog etc)
- ☐ Watch a video lesson
- ☐ Complete any work not done in class - not "giving" homework
- ☐ Other (please specify)

4. What types of activities work best with your students?

- ☐ Worksheets
- ☐ Partner Work
- ☐ Manipulatives
- ☐ Computer/iPad Practice
- ☐ Review Games
- ☐ Card Games
- ☐ Dice Games
- ☐ Discussion
- ☐ Projects to apply math concepts
- ☐ Projects using technology.
- ☐ Other (please specify)

5. How often do you use technology in your classroom?

- ☐ Daily
- ☐ Weekly
- ☐ Monthly
- ☐ Few times a year
- ☐ I do not use technology in my classroom.



6. On average, how many minutes a day are spent on math in your classroom?

- ☐ 15 minutes
- ☐ 30 minutes
- ☐ 45 minutes
- ☐ 60 minutes
- ☐ 90 minutes
- ☐ More than 90 minutes

7. Please rank the following components of a math resource. 1 being most important and 7 being least important to your instruction of math.

<input type="text"/>	Manipulatives/Hands-on activities
<input type="text"/>	Practice sets of problems
<input type="text"/>	Real-life applications
<input type="text"/>	Re-teach resources
<input type="text"/>	Sample problems
<input type="text"/>	Extension activities
<input type="text"/>	Resources/Templates

8. Please indicate the level to which you agree with the following statements.

	Strongly Disagree	Somewhat Agree	Agree	Strongly Agree
I am able to get through the math standards in a school year.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to adapt activities to meet the needs of my students with the resources I have.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel the math curriculum I am currently using is aligned to the standards.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The curriculum affords opportunities for home to school connections.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have the technology to support my curriculum.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. On a scale from 1 to 5 how comfortable are you with the math standards at your grade level?

I really am not familiar with the math standards.	I have some knowledge of the math standards.	I know the math standards.	I know the math standards and how they are addressed in all of my lessons.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. What do you feel are strengths of the current math curriculum at your level? Please be sure to include all levels you teach in your response.

11. What do you feel are weaknesses of the current math curriculum at your level? Please be sure to include all levels you teach in your response.

12. Do you feel you have adequate resources to meet the needs of all students? If not, what resources are needed for you to meet the needs of all students?

If not, please share what resources are needed.

13. What professional development do you feel is needed in the area of math?

14. In what ways do you use technology to teach math?

## Math Curriculum Student Survey

### Math Student Survey

\* 1. How much MATH homework do you have most days?

- ☐ NONE
- ☐ 5-15 min.
- ☐ 20-30 min.
- ☐ 45-60 min.
- ☐ More than an hour

2. Where do you do your homework each night?

\* 3. What kinds of MATH homework do you usually have? (choose all that apply)

- ☐ Practice problems from that day's lesson
- ☐ Practice problems from a previous lesson
- ☐ Individual Projects
- ☐ Group projects
- ☐ Educational Math Games (iXL, SumDog, etc)
- ☐ Watch a video lesson

\* 4. Select which classroom MATH activities you prefer and help you to learn math best.

Choose all that apply.

- ☐ Computer or iPad Game/Practice
- ☐ Card Games
- ☐ Dice Games
- ☐ Worksheets
- ☐ Partner/Group Work
- ☐ Discussion
- ☐ Review Games
- ☐ Projects - Real Life Math Problem Solving
- ☐ Projects using technology (iPads, laptops, etc)
- ☐ Other (please specify)

\* 5. What do you do when you have to solve a difficult or challenging math problem AT HOME?

Check all that apply.

- ☐ Ask a parent
- ☐ Ask a friend
- ☐ Textbook
- ☐ Online textbook
- ☐ Online videos or tutorials
- ☐ Keep trying until I figure it out on my own
- ☐ Review notes from class
- ☐ Other (please specify)

6. Comments

\* 7. On a scale of 1 to 4 rate your confidence level in math.

Not confident at all. I struggle in math.	Somewhat confident. I have some trouble in math.	Confident. I do well in math.	Very confident. I excel in math.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* 8. On a scale of 1 to 4 rate your understanding of your daily math lesson.

I'm lost most days. I don't understand information from daily lessons.	I understand some of the information but wish I knew more.	I understand most of the information from daily lessons.	I understand all math content from daily lessons.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. One of the district goals is to transform teaching and learning through the use of technology. What is your comfort level with moving to a more digital math curriculum?

Not comfortable at all, I very much prefer paper and pencil.	Somewhat comfortable, I like a mix of both paper and digital.	Very comfortable, I prefer to have a digital version of my math content.
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Comments

\* 11. What grade are you in?

- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ 9
- ☐ 10
- ☐ 11
- ☐ 12

## Math Curriculum Student Survey

9th, 10th and 11th Grade

\* 12. Do you plan to take 4 years of math in high school?

## Math Curriculum Student Survey

12th grade

\* 13. Did you take 4 years of math in high school?

☐



## Appendix E

### SWOT Analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> <li>• District wide intentional focus on math</li> <li>• Access to technology</li> <li>• Thoughtful about intentional math placement recommendations which include data points as well as teacher input (5-12)</li> <li>• 5th and 6th grade have common planning time</li> <li>• Math teachers communicating with grade level colleagues at Middle School</li> <li>• Aligned at middle school grade levels with scope and sequence and common assessments aligned to the standards</li> <li>• Collaboratively taught special education math courses at Middle School and High School</li> <li>• All elementary schools have intervention support (.2 FTE)</li> <li>• High school core class size as compared to other districts</li> <li>• Staff knowledge/experience</li> <li>• Flexible/multiple pathways at the high school</li> </ul>	<ul style="list-style-type: none"> <li>• Disproportionality in demographics of higher-level courses               <ul style="list-style-type: none"> <li>◦ ethnic groups</li> <li>◦ SPED</li> <li>◦ ESL</li> <li>◦ FRP</li> <li>◦ Gender</li> </ul> </li> <li>• Transition from elementary to middle school.</li> <li>• Lower level intervention support not necessarily aligned to need at elementary</li> <li>• Lack of ESL support in math</li> <li>• Inequity in intervention support as compared to literacy interventions</li> <li>• Lack of training for paraprofessionals to support math concepts</li> <li>• Communication of the value of math intervention to parents to encourage participation</li> <li>• Lack of consistency in Math Intervention               <ul style="list-style-type: none"> <li>◦ curriculum</li> <li>◦ identified but choose to opt out</li> <li>◦ identify new students</li> <li>◦ looking at data</li> </ul> </li> <li>• Acceleration and enrichment practices</li> <li>• Resources for Special Education and ESL</li> <li>• Inconsistent sets of resources across all sites</li> <li>• Lack of depth in curriculum at elementary (Spiraled curriculum)</li> <li>• Limited resources in curriculum for parents</li> <li>• Inconsistent use of assessments at elementary</li> <li>• Inconsistent time spent on math at Elementary Level</li> <li>• Intervention at elementary (3rd/4th) pulled out of subjects kids enjoy</li> </ul>

	<ul style="list-style-type: none"> <li>• placement based on level of support needed E-12</li> <li>• Dated resources - online access is paid for on a yearly basis</li> <li>• Lack of consistency with homework and grading K-12</li> <li>• Too many low level classes</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>• Delay in standards review - able to work with standards we know</li> <li>• Peer tutoring program</li> <li>• College credit for AP Courses</li> <li>• Partnerships with community and colleges</li> <li>• Career Exploration (math related fields)</li> <li>• Summer/After school/Winter and Spring Break camps for K-12</li> <li>• Targeted Services</li> <li>• Intervention or enrichment during the day for all students</li> <li>• Zero hour at middle school</li> <li>• Parent Development sessions in math</li> </ul>	<ul style="list-style-type: none"> <li>• High ability students leave schools (mobility)</li> <li>• Transfer student enrollment</li> <li>• Parent pressure to push into advanced classes before students are really ready</li> <li>• State testing mandates</li> <li>• Funding regulations (ADSIS, SPED)</li> <li>• Funding for staffing- support (Title III-EL) <ul style="list-style-type: none"> <li>◦ input from math department on funding for staffing</li> </ul> </li> <li>• Availability of resources in spanish or other languages</li> </ul>