

## K-12 Math Curriculum Review

## Year 1 Self-Study

West St. Paul - Mendota Heights - Eagan Area Schools School District 197

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## Background

### **Previous District-wide Mathematics Reviews Processes**

During the 2015-2016 and 2016-2017 school years, School District 197 conducted its first large scale mathematics review process in nearly eight years. The team at the time determined that, even though the standards were not going to be reviewed at the state level (which is described below) they would continue as planned with a local math review. Much work had occurred between 2013 and 2017 with the middle school and high school, including the addition of math intervention. These were among the many reasons that indicated a need for a PreK - 12 math review.

The core resources used at the time were over eight years old. Some of the resources were out of print and the online access for them had expired and required an annual subscription fee. With the addition of 1:1 devices for students in grades three through twelve, the team identified a need to assure that their resources are compatible and accessible on those devices. There was also a need to review math acceleration pathways and curriculum.

The process used in the past review cycle is similar in many ways to what our process is now, including but not limited to, developing Core Beliefs, identifying strengths and weaknesses, and reviewing instructional materials.

Among the major work that was conducted in its second year, the team spent time

- unpacking the 2007 standards
- evaluating curricular resources which led up to a formal recommendation at each level
- defining math pathways at the secondary level
- developing scope and sequences and common assessments
- and participating in professional development to support the overall mathematics implementation.

The expiration date for the digital portion of the instructional resources the team implemented, starting in the fall of 2017, will expire by the spring of 2024, which aligns with the expected timeline for conducting the current review process that is described below.

**Understanding the Current Standards (2007 Version):** The Minnesota K-12 Academic Standards in Mathematics are grounded in the belief that all students can and should be mathematically proficient. All students need to learn important mathematical concepts, skills and relationships with understanding. The standards describe a connected body of mathematical knowledge students learn through the processes of problem-solving, reasoning and proof, communication, connections, and representation. The 2007 standards are grouped by strands:

- Number and Operation
- Algebra
- Geometry and Measurement
- and Data Analysis and Probability.

## Assessments (2007 Version)

The Minnesota Comprehensive Assessment (MCA) III Mathematics exam assesses the mathematics standards in grades 3-8 and 11. Currently, there are also standards for literacy in science and technical subjects contained within the Minnesota K-12 Academic Standards in English Language Arts (2010). The MCAs and the Minnesota Test of Academic Skills (MTAS) are state tests that help districts measure student progress toward Minnesota's academic standards. Most students take the MCA, but students who receive special education services and meet eligibility criteria may take the MTAS.

## Graduation Requirements (Current, as of spring 2022)

The graduation requirements for mathematics include credit requirements and standards requirements. All students are required to satisfactorily complete three credits in mathematics encompassing the high school academic standards, which include algebra, geometry, statistics and probability.

- Students in the graduating class of 2015 and beyond must complete an algebra II credit or its equivalent as part of the 3-credit requirement.
- In addition to the high school credits, students in the graduating class of 2015 and beyond must also complete an algebra credit by the end of eighth grade.

There are also state-approved credit equivalencies to fulfill math graduation requirements. These are noted below.

- A career and technical education credit may fulfill a mathematics or arts credit requirement under subdivision 1, clause (2) or (6) if the credit meets the state academic standards in arts or mathematics.
- A computer science credit may fulfill a mathematics credit requirement under subdivision 1, clause (2), if the credit meets state academic standards in mathematics.
- A Project Lead the Way credit may fulfill a science or mathematics credit requirement under subdivision 1, clause (2) or (4), if the credit meets the state academic standards in science or mathematics.

## Status and timeline for the 2021-2022 state standards review

The mathematics standards were revised in 2007, with full implementation by the 2010-11 school year. Though the math standards were scheduled to be reviewed again during the 2015-16 school year, the review was postponed during the spring 2015 first special legislative session, according to Chapter 3, H.F. 1. The postponed timeline rescheduled the math standards review to begin in 2021-22.

The Minnesota K–12 Academic Standards in Mathematics represent the work of the Mathematics Standards Review Committee. This committee included K–12 teachers, administrators, college faculty and representatives of educational and community organizations.

During the 2021–22 school year, the Minnesota Department of Education's Mathematics Standards Review Committee reviewed the 2007 Minnesota K12 Academic Standards in Mathematics, other states' recently revised standards, current academic research, K–12 instructional best practices and public feedback. This review process followed the guidelines in Minnesota Statutes, 120B.021, subdivision 4e.

• The standards and anchor standards provide a summary description of student learning.

- The kindergarten through grade 12 benchmarks identify a "specific knowledge or skill that a student must master to complete part of an academic standard by the end of the grade level or grade band."
- (Minnesota Statutes, 120.B.018) Minnesota Statute, 120B.021, requires that there be statements of standards and benchmarks.
- Minnesota Statute, 120B.021, subdivision 4a states that, "the commissioner must include the contributions of Minnesota American Indian tribes and communities as related to the academic standards during the review and revision of the required academic standards."

The four Dakota and seven Anishinaabe Tribal Nations, as well as Minnesota's significant Urban Indigenous communities, have been relatively invisible in Minnesota's academic standards, and statute 120B.021 counteracts that invisibility and lack of representation in Minnesota's education system. This statute requirement, added by the legislature in 2007, demonstrates the commitment of the State of Minnesota to ensure that the contributions of the Tribal Nations in Minnesota are integrated into student academic learning and instruction. Minnesota's K-12 Academic Standards in Mathematics include the historical and current contributions of the eleven sovereign, federally recognized Tribal Nations in Minnesota's academic standards are reviewed and revised on a 10-year cycle.

On December 27, 2022, the third version of the mathematics standards was released and the statutory rulemaking process for the standards began. The statutory rulemaking process is an iterative one and begins once the initial review and revision work of the standards review committee is complete. This process is set out in Minnesota Statutes, chapter 14 and is a complex process with many steps. The proposed K-12 academic standards in mathematics represent the work of the mathematics standards review committee.

## Organization of the 2022 Standards

The organization and structure of the 2022 Minnesota K-12 Academic Standards in Mathematics communicate how mathematics education is conceptualized for Minnesota students.

- The standards are ordered by grade, beginning in kindergarten (represented by zero) and ending in high school (represented by 9).
- In each grade the standards are subdivided into strand, anchor standard and benchmark.
- An additional dimension within benchmarks are mathematical practices and benchmarks contexts which serve to encourage integration of concepts through process and context.

The three strands, Data Analysis, Spatial Reasoning and Patterns and Relationships, organize the standards. Most strands have seven anchor standards which are consistent across kindergarten through grade 11. Each standard will have one or more benchmarks that are grade-level specific that define a specific knowledge or skill a student must master. The benchmarks are placed at the end of the grade level where mastery is expected with the recognition that a progression of learning experiences in earlier grades builds the foundation for mastery later on. Strands The standards are organized into three strands common across all grade levels:

- Data Analysis "Data are not merely numbers but numbers in context." (Cobb and Moore, 1997) Students will develop questions about situations impacting their everyday lives, make a plan to produce data, and provide answers by organizing, describing, and summarizing the 2022 Minnesota K-12 Academic Standards in Mathematics 4 data. In addition, students will develop and evaluate inferences and make predictions. They will learn how to organize randomness to understand important relationships and use the concept of variability to make sense of the world.
- Spatial Reasoning Students will actively make sense of relationships between and within geometric figures, generalize statements about the figures, and develop arguments about what they found.
- Patterns and Relationships Mathematics is the science of pattern and order. Students will organize
  and describe the world they live in using representations of numbers and operations. They will learn
  actions that transform numbers as well as ways of thinking that bring them back to where they started.
  They will analyze and describe relationships among variables by focusing on how things change and
  how they stay the same.

Anchor Standards Minnesota Statutes 2021, section 120B.021, requires that there be statements of standards and benchmarks. Anchor standards are a summary description of student learning that reflects a learning progression, spanning from kindergarten to graduation. There are seven anchor strands organized into three strands.

Anchor Standards by Strand

- 1. Data Analysis 1. Data Sciences: Identify, formulate and investigate statistical questions by collecting data considering cultural perspectives, analyzing and interpreting data and communicating the results.
- Chance and Uncertainty: Apply and explain the concepts of probability to interpret data, generate questions, predict and make informed decisions to solve problems and communicate ideas. 2022 Minnesota K-12 Academic Standards in Mathematics 5 Strand 2: Spatial Reasoning
- 3. Measurement: Investigate measurement using a variety of tools, units, systems, processes and techniques in various cultures. Explain and reason with attributes, estimations and formulas to communicate measurement(s) and relationships effectively. Justify decisions and consider the reasonableness of the measurement.
- 4. Geometry: Analyze characteristics of geometric shapes to make mathematical arguments and justifications about geometric relationships. Use visualization and geometric modeling to compare, solve problems and communicate ideas. Strand 3: Patterns and Relationships
- 5. Number Relationships: Describe/Interpret and use quantities, relationships between and representations of quantities and number systems. Describe and relate operations. Use strategies and procedures accurately, efficiently and flexibly. Assess the reasonableness of the results.
- 6. Equivalence and Relational Thinking: Use concepts and properties of equivalence and relational thinking to represent and compare numerical expressions, proportional relationships, algebraic expressions and equations.
- 7. Patterns and Relationships: Represent and connect mathematical patterns and relationships using verbal descriptions, generalizations, tables and graphs. Use representations to generate questions, make predictions and solve mathematical problems.

## Next Steps in the Statutory Rulemaking Process

- The first step of the statutory rulemaking process for the K-12 academic standards in Mathematics is publishing the Request for Comments in the State Register. This comment period ended on February 27, 2023.
- It is still early in the statutory rulemaking phase of the standards review and revision process. There are multiple opportunities throughout this phase for the public to make comments and provide feedback on the proposed standards language and for changes to be considered and made to the initial proposed standards draft.
- The next step of the statutory rulemaking process is that MDE will review the public comments submitted to the Office of Administrative Hearings (OAH) during the 60-day statutory public comment period. Next, MDE will draft the Statement of Need and Reasonableness (SONAR), which has traditionally taken 14-17 months. The full statutory rulemaking process can take up to 24 months.
- The statutory rulemaking process for the Minnesota K-12 Academic Standards in Mathematics is not complete until the Notice of Adoption is published in the State Register. Each content area includes an implementation date in the adopted rule language. If adopted, the proposed K-12 academic standards in mathematics will be implemented in the 2027-28 school year.

## Summary

During the 2021-2022 school year, School District 197 hosted two optional virtual meetings with any interested K-12 staff members to keep current on the state standards review process as it unfolded. These meetings were held in February and May of 2022. The three main topics in each of these meetings were to review the proposed drafts as they were released, discuss potential implications for us in School District 197, and to allow staff the time and opportunity to submit comments and feedback to our state's review team.

Beginning in the fall of 2022, a review team (Appendix A) was put together including a representative K-12 group of teachers, as well as building and district administrators to evaluate the mathematics programming in School District 197. As a part of the review process in year one, our entire K-12 committee:

- read and discussed new research on best practices in teaching mathematics, *Catalyzing Change: Initiating Critical Conversations (NCTM).*
- performed both an internal and external environmental scan,
- developed Core Beliefs and Outcomes that Matter to All,
- surveyed students, staff and families,
- conducted a Strengths and Weaknesses Analysis,
- reviewed the proposed state changes for mathematics requirements and standards,
- and reviewed a variety of achievement measures in mathematics.

A summary and applicable insights for each element listed above can be found in the following report.

The team had originally planned on meeting in-person four times during the school year, however, due to issues, which included but are not limited to, substitute shortages, we made the decision to adjust our meeting plans. Instead of four in-person meetings, we held three, and we worked asynchronously for one session as

well. The first session was our asynchronous session, which allowed our team to do work that lent itself well to this approach, such as reviewing previous math review processes in ISD 197. The last three meetings took place In November, January, and March.

## Internal and External Environmental Scans

In order to get a broad sense of what students' math experience looks like across the district, our curriculum review team conducted both an internal and external environmental scan of mathematics instruction. The first phase of our internal environmental scan was to review the work and recommendations of the previous math review team. Review members revisited the year 1 and year 2 board reports for the math review process, which outlines the specifics about which decisions were made and for what reasons. While the team conducted this review of those two previous board reports, they were asked to consider these four questions:

- What aspects from the previous review process could be a focal point again for this review cycle?
- How has mathematics instruction and/or the way that students learn math, changed since the previous cycle?
- What changes since the previous review have had the most impact on our students' outcomes?
- What recommendations from the previous review have yet to have the intended impact on students?

Included is a summary of how the team responded to those four questions.

## How has mathematics instruction and/or the way students learn math, changed?

- Technology resources are used quite heavily at the middle level, which can be both positive and negative.
- With technology becoming a bigger focal point for learning, there have been more challenges with students communicating through writing as well as students knowing how to use their textbook as a resource.
- We are better educated in trauma-informed and culturally responsive practices and know that students have many needs as result of the COVID-19 pandemic and we are challenged with addressing those needs throughout all content areas.
- Manipulatives continue to be, and always have been, important for developing student understanding
- Mathematics instruction is continually evolving to match our changing student populations.
- Technology tools continue to change the way that students learn mathematics.
- The emphasis on personalizing learning for students impacts how our resources are used for instruction.
- There has been a reinvestment in numeracy and operations, as well as explaining math thinking, and this also impacts how our resources are used.

## What might you suggest has had the most positive impact on our students?

- Multiple entry to **accelerated** process in middle school.
- Visual math pathways have been positive, especially for teachers to share with parents.
- Not skipping math, putting 3 years of math in 2 years, has led to more success.
- More effectively identifying **accelerated** math students.
- Consistent curriculum has helped positively impact students.
- 2nd-8th grade under the same curriculum eases the transition to middle school.
- Having a **common scope and sequence and assessments** has had a positive impact for students and allowed for teacher growth and cooperation.
- Number Corner (Bridges) is rich in content.
- Bridges 10-frame and combinations of 5 and 10 approach has been positive.
- Primary foundational skills addressed and math talk supported with Bridges Curriculum.
- GoMath has fostered great number sense and real world multi-step word problems.
- Supporting Spanish-speaking students/families with **GoMath** curriculum in Spanish.
- The examples and explore activities in Go Math, the enrichment and puzzle extras from big ideas.
- Relationships built in the math classroom; positive classroom culture (mistakes are celebrated, we can all be "math people").
- Support for all students' needs.

## What might you suggest has yet to have the impact it was intended to have on our students?

- Increase in testing scores
- Addressing performance and participation disparities
- Technology not as supportive as we had hoped, not always working
- Curriculum the need to supplement is still there
- Some digital tools just weren't what was expected not as supportive/practice based
- Parents have expressed wanting more resources to support their students

# For the second portion of our internal environmental scan, review members worked in grade and/or course-like groups to identify responses for a variety of questions, including but not limited to, the ones listed:

- How much time do we have dedicated to math instruction at each grade and site?
- What does instruction during this time look like (whole group, small group, independent practice, etc.)?
- What are the expected instructional practices or strategies used in math?
- What instructional materials do we utilize to teach math?

Below are a few examples of positive insights drawn from the internal environmental scan.

- There is an abundance of courses and opportunities for students at the high school level.
- There are several ways digital resources are used at each level, and these help with differentiation.
- Common assessments and common scope and sequences help to maintain alignment to standards.
- Hands-on manipulatives and visual supports provide concrete scaffolds for student learning.

- There are a variety of instructional approaches used, including whole and small group instruction and elements of personalized learning.
- There are many ways in which students can be challenged in the classroom, starting with math enrichment in the elementaries and multiple opportunities to access accelerated options beginning in middle school.

Additionally, the team identified some potential areas of concern, which could be investigated further:

- How can we structure intervention so it is optimally effective while reducing unnecessary burnout?
- Supplemental resources for elementary-age students and for our English-Learners are needed.
- Finding the right balance between technology and analog resources and tools will be important.
- Reimagining ways in which to harness the power of teacher and student relationships to learn.
- Revisiting the impact that printed writing can have on developing math skills.
- Reinvesting in the need to develop math fundamentals, such as number and fact fluency.
- There are gaps in the curriculum that make it difficult for meeting all the math standards.
- Considerations around the amount of teacher prep necessary for unit and lesson planning/execution.
- Strengthening and broadening math Intervention support for struggling students is critical.
- What resources and support can we provide our families of our younger students to learn math.
- Technology usage for lessons, homework, tests, etc. and how it is aligned K-12.

**MN Standards Comparison** - The third portion of our internal environmental scan involved a closer inspection between the 2007 and 2022 Minnesota State Math Standards. Through this process, the team was able to gauge the amount of similarities and differences that exist between the current (2007) and future (2022) math standards. The generalized differences, along with specific examples, in benchmarks identified by the review team are included in Appendix C.

## Elementary

- Mentioned before the standards: strand organization, standards of mathematical process, key symbols to identify tribal nation contexts, financial literacy, etc.
- The number of standards has increased at each grade level
  - K: 13→20
  - 1:20→28
  - 2:20→31
  - 3: 26→29
  - o 4: 27→40
- New strands
  - From numbers and operations, algebra, geometry and measurement, data analysis
  - $\circ$   $\;$  To Data analysis, spatial reasoning, patterns and relationship

The anchor standards in the 2017 version are consistent grade-to-grade, while the standards in the 2007 document change based on the grade level.

## **Middle School**

- New focus on the Standards for Mathematical Practice (MP1-8).
- Use of symbols to identify Minnesota tribal nations contexts, financial literacy contexts, computer science contexts, modeling contexts, and real world contexts.
- Data Analysis now first.
- New strands: Spatial Reasoning, Pattern and Relationships (instead of numbers/ operations and algebra).
- No longer have strands named: Geometry & Measurement, Algebra, Number & Operations, and Probability no longer with Data Analysis.
- Now have Anchor Standards instead of Standards.

## **High School**

- 2007 Strands: Algebra, Geometry & Measurements and Data & Probability
- 2022 Strands (with standard subheadings):
  - Data Analysis
    - Data Sciences
    - Chance and uncertainty
  - Spatial Reasoning
    - Measurement
    - Geometry
  - Patterns & Relationships
    - Number relationships
    - Equivalence and relational thinking
    - Patterns and relationships
- Benchmark contexts indicate where other areas of mathematics are emphasized, such as symbols for MN tribal nations, financial literacy, computer science, modeling and real world contexts.
- The Standards of Mathematical Process (MP) are referenced as well within specific benchmarks.
- 2007 standards give examples within the benchmarks, 2022 does not, so far at least.

## **External Environmental Scan**

Once the team had conducted their internal environmental scan, they turned their attention towards what is observable externally in terms of how mathematics is approached across the metro, as well as through leading research from national organizations.

The first phase of our external environmental scan focused on exploring how districts across the metro approached mathematics instruction, curriculum, and secondary courses and course pathways.



The review team studied nearly 30 districts' course registration guides and district websites/related materials during this process, from districts that are identified as comparable, competitive, or closeby. This helps the team to see both how similar districts (comparables) as ISD 197 approach mathematics education, as well as how districts that may not be similar, but are nearby or often noted as competitive, approach it as well.

A few of the insights and key findings are noted below, and will likely be brought into the work of the Year 2 team as they create their middle and high school course sequences for math.

- Many districts follow a similar high school math course sequence for graduation required courses (Algebra, Geometry, Algebra 2).
- Some districts have reorganized their math programming to have a career focus/alignment.
- While there are some similarities, each district approaches advanced course opportunities differently.
- Some high schools are offering online versions of some math courses.
- Some middle schools have created EL sheltered math classes.
- Some middle schools have created easy to follow and understand pathways.



The second phase of the external scan centers on reviewing important literature in the content area. Fortunately, the National Council of Teachers of Mathematics had recently conducted a comprehensive review of mathematics education in K-12 settings. This involved administrators, higher education faculty, educators, and leaders in mathematics education. The three part publication, which our team was able to take

the time to review and discuss, addresses policies, practices, and issues in K-12 math education, and includes practical recommendations to help create positive change.

As the review process unfolded, staff were led through a series of reading selections from the resources, and then organized into small groups to report out what they were learning about and any implications for our planning as a review team.

Some of the insights and key findings from this activity are listed below.

- Characteristics of mathematically powerful learning spaces for students include...
  - Students discussing math, and collaborating with each other is critical in math classrooms.
  - Students use a variety of strategies and approaches to solve problems.
  - Students feel a sense of safety and comfort in their classroom, and therefore are willing to take risks as they learn math concepts and develop confidence in their math skills.
- Student confidence and emotions play a large role in learning math, and this confidence is directly related to success in math.
- The need for foundational skills in early mathematics is as important now as it ever was.
- Mathematical development is cumulative, and is best supported through aligned programs.
- It is imperative that we inspect, and dismantle where possible, inequitable structures, and challenge spaces of marginality and privilege.

## Core Beliefs and Outcomes that Matter to All

As a team we continue to come back to our School District 197 Strategic Framework. The core beliefs lead us in all of the work that we do. You will find below our core beliefs, and our Outcomes that Matter to All that are specific to K-12 Math. Both of these sets of statements, in addition to our 4-way equity test guide all of the work we do in pursuit of a guaranteed and viable math curriculum.

## **Core Beliefs**

We believe...

- People thrive when they feel connected, trusted and affirmed.
- Communication and collaboration strengthen school, family and community relationships.
- Our diversity makes us stronger.
- Seeking to understand each other strengthens the individual and community.
- We are all accountable for removing barriers and creating equitable systems.
- High explanations and personalized support are critical for student success.
- Innovative environments promote curiosity, creativity and courageous action.
- Everyone has the ability to continually grow.

## Outcomes that Matter to All for K-12 Mathematics

- Students will graduate and be career ready.
- Students will be able to think flexibly about and represent mathematical concepts in various ways.
- Students will use technology to apply and deepen their understanding of mathematical concepts.
- Students will represent math concepts and demonstrate their understanding verbally, graphically, visually and mathematically.
- Students will be able to persevere to effectively solve problems and maintain a growth mindset.
- Students will be able to make connections between mathematical concepts and apply them to real-world problems.
- Students will have the confidence to ask questions to deepen mathematical understanding.
- Students will think critically and collaborate with others to guide decision-making.
- Students will be "doers" of math and be empowered to see themselves as mathematicians.
- All students will have the same opportunities as their peers to access mathematics.

## **Strengths and Weaknesses**

The curriculum review team dedicated time across the year to discuss what they believed to be the strengths and weaknesses of mathematics education in School District 197. As the team completed the various tasks associated with curriculum review, items were added or modified to reflect the team's most current findings. A summary of what the committee identified as strengths and weaknesses within mathematics instruction are included in the table below.

|   | Strengths  | Weaknesses   |
|---|--|--|
|   | Inquiry and number sense<br>building in grades K and 1.<br>(Bridges) | How much ability grouping is being used at all levels.<br>Catalyzing Change recommends not using ability<br>grouping - how do we do this and still meet the needs of<br>all?                                     |
| Topics which<br>were identified<br>the most | Multi-step problem solving<br>in 2-4. (Go Math)                      | K-4 buildings have two different math curriculum resources. (Bridges at K-1, Go Math at 2-4)   |
|   | when there is time for this.   | Pacing of certain units with a significant amount of vocabulary. Example: Geometry unit - moves very quickly   |
|   | Tech tools that work as<br>expected and are user                     | for those learning the language.   |
|   | friendly.  | Middle School would like more grab and go lessons.   |
|   | Continuity in math resources from 2nd grade through                  | Curriculum that is engaging and relevant.  |
|   | 7th/8th grade.   | Problem Solving is critical in math.   |
|   | High School resource - Big<br>Ideas is working well.                 | Go Math tech tools (middle school)   |
|   |  | Too many options in the curriculum leading to diminishing returns and teachers still making their own resources.   |
|   |  | Main area for improvement at the high school is instructional in nature, not necessarily resource-based.   |
|   |  | Fortified tracking is problematic (for staff and students).<br>Example - Analysis, PreCalc, Alg II w/trig. How can there<br>be multiple pathways for students to access<br>advanced/elective math opportunities? |

It is evident that our greatest strength in mathematics programming is the work that was done over the last few years in making a bridge between elementary and middle school with consistent resources. We have strengths in the use of technology to support learning that is ever changing and we will need to continue to monitor its use to ensure it is "user-friendly" and getting the results we are looking for in student engagement and achievement.

Our elementary staff would love to see a consistent resource that continues to ask students to develop number sense and problem-solving skills. Number Corner is a resource in K-1 that many 2-4 teachers would like to use to spiral review number sense topics throughout the year.

At the middle school level teachers would like to see more enhanced technology tools and a resource that all teachers can use without having to make significant modifications. Additionally, several recommendations from the Catalyzing Change resource were presented as ways in which we could improve our programming. These were (a) addressing inequities in how courses, students, and staff may be tracked, (b) how these systems negatively impact student outcomes, (c) how to overcome these inequities, and (d) developing deep mathematical understanding through relevant and challenging math activities and resources that all students can experience.

At the high school level the teaching resource has many options for teachers to utilize - this is both a strength and a weakness that will be reviewed throughout this process. The major piece the high school would like to see discussed is instructional strategies and expectations so that all students have access to high quality math instruction.

## Survey Data/Input Gathering

Curriculum review teams during the first year of review conduct input-gathering activities that collect information from students, staff, families, and community members. Typically teams work to collect data through surveys sent to each group. The math review team followed this process as well as collecting data through two other ways: student written testimonies and a student panel. Each of these processes are described below.

## Surveys

Surveys were developed for teachers, students and families to complete in regards to mathematics curriculum and instruction in our school district. The surveys were sent to families electronically and were made available on paper in English and Spanish in a variety of ways. Students in Grades 3 through 12 were asked to complete the survey during their mathematics classes. Below are highlights from the response rates of the survey.

| what<br>the in | are the strengths of your current math instructional resources? When responding, please us   |
|----------------|--|
| u ie ii        | structional resources listed below as your name of reference.                                |
| K - 1:         | Bridges  |
| Gr 2 ·         | 8: Go Math   |
| HS re          | quired courses: Big Ideas  |
| Long           | answer text  |
|                |  |
| What           | are your concerns about your current math instructional resources? When responding, pleas    |
| uset           | te instructional resources listed below as your frame of reference.                          |
| K - 1:         | Bridges  |
| Gr 2           | 8: Go Math   |
| HS re          | quired courses: Big Ideas  |
| Long           | answer text  |
|                |  |
| What           | are the strengths of your current math instructional resources for non-graduation required   |
| cours          | es at the high school?   |
| Long           | answer text  |
| What           | are concerns of your current math instructional resources for non-oraduation required course |
| at the         | s high school?   |
|                |  |

Student Survey

- ~1400 students responded (about 27% from the elementary schools, 60% of responses from the middle schools, and 13% from the high school)
- Of the over 1400 student responses, more than 1250 students provided demographic information
- 46% of the 1250+ students identified themselves as students of color
- 23% of the students reported that they currently receive ELL services
- 9% of the students reported that they have an IEP

Family Survey

- Over 900 individual responses were collected (452 from families with an elementary-aged student, 277 from families of middle school-aged students, and 179 from families of high school-aged students)
- Of the over 900 family responses, more than 650 families provided demographic information
- 33% of the 650+ family responses were from families who identified themselves as families of color
- 16% of the families reported that their student current receives ELL services
- 35% of the families reported that their student has an IEP

Staff Survey

 Nearly 90 staff completed the survey - With as expected rates from each level (elementary/middle/high)

This was the second year in which we were able to collect self-reported data during curriculum review on demographic details such as race, language, and special education status. The team was pleased to see that the response rates were somewhat close to the demographic composition of our community. A demographically-comparable set of data helps to better inform the insights and recommendations made from surveying our students, staff and families.

The recurring themes from the surveys were integrated into the strengths and weaknesses in the previous section. The questions on the survey can be found in Appendix B.



## Student-written testimonies and Student Panel

In the fall of 2022 a representative group of students were identified to help in providing input for some specific grant-related tasks for the Expansion of Rigorous Course Grant. Over the course of the first semester, this group also was able to help with other important topics, such as providing input on the Middle School Schedule Review process, new courses being proposed at TRHS, and other curricular-related topics. This group, now more formally called the Student Curriculum Advisory Committee, is currently serving as a parallel to the community-based Curriculum Advisory Committee.

As a part of the Student Curriculum Advisory Committee's ongoing work, they are asked to provide input for curriculum review teams. Two options were made available to students on this committee. Students could provide a written testimony, and/or participate in a student panel that would talk in-person with the math review committee. This panel worked through a set of questions that were collaboratively developed by the review team and then shared with the students. In all, five students submitted written responses, and another seven offered to serve on the student panel.

The students' written testimonies included responses to the same questions, which are listed below:

- What class did you make the most math improvements in? What is it about that experience that helped you make that type of improvement?
- What class did you make the least math improvement in? What is it about that experience that contributed to you not making as much progress as you did in other math classes?
- Is there anything about the actual math books and materials that you find helpful, not helpful?
- What are the three to four biggest changes between elementary and middle school math, and middle and high school math? What were the most difficult challenges to overcome?

The questions that were asked during the student panel are noted below. You will notice that several of the first questions were also asked on the student testimony questions from above.

- How would you describe your path in our district as a math student?
- What class did you make the most math improvements in? What is it about that experience that helped you make that type of improvement?
- What class did you make the least math improvement in? What is it about that experience that contributed to you not making as much progress as you did in other math classes?
- Many factors play a role in how students learn math, including books, tech tools, classroom environment, methods of instruction, working with peers, relationships with teachers, etc. In your experience, what would you rank as the two most important features of math that have led to your success in math?
- What are the one or two things that you think is most important for our district math staff to know that could help support students the most in their math learning?
- What about the math resources (books, workbooks, etc) and/or digital materials that you have used (DreamBox, iXL, ALEKS, Desmos, HMH Player, etc.) have you found helpful, not helpful?
- What are the three to four biggest changes between elementary and middle school math, and middle and high school math? What were the most difficult challenges to overcome?

## The themes from both the student testimonies and the student panel are noted below.

## **Relationships matter**

- Relationships are above all, the most important lever for impacting the student's experience (+ or -)
- Don't assume that we know the information that is needed for the current lesson. Take the time to help build the bridge from lessons/information before to learn about things now.

## Instruction

- Students learn many different ways consider how classroom resources and instruction support that
- Some students are naturally going to make **connections with teachers** some are not. However, the need for those connections (asking questions, help etc.) is critical.
- Using your notes is one way we can learn, however it isn't always the best way. Some students prefer people interaction as much or even more.
- Level of independence with students. What is the standard way of independence that can be provided? Too much? Too little? How well can teachers adapt to students' needs?
- **504 plans and IEPS** are important to be aware of to make sure teachers are accommodating for them.
- What are the changes from PD days into classes? What are staff doing during those days? What is the benefit to me?

## Resources

- Resources that provide students with support to get **feedback and instructional support** is helpful.
- In what ways can resources be the conduit to developing relationships?

## **Continuity and consistency**

- **Different grading approaches** across the same course, within the same building, etc, are frustrating for students. Changing approaches in the same class/same teacher in the middle of the year is very frustrating. Changing teachers (same course) at semesters with different ways of grading is frustrating.
- Can there be more **common ways in which math is approached**? What are some common ways staff could structure math instruction (grouping, ways of interaction), the amount/type of homework assigned, how homework is graded (correctness v completion).

## Data Analysis

| Strategic Frame  | work   |  |  |
|--|--|--|--|
| MISSION STATEME<br>School District 197<br>for all.   | NT<br>is committed to caring relation:                                   | ships, equitable p   | ractices, and high achievement   |
| SCHOO<br>Nutive Inspire  | D <b>L DISTRICT 197</b><br>Frepare: Tigeffter, No Tirture:               | DIST<br>Elbuar, Inspi  | <b>RITO ESCOLAR 197</b><br>rat. Prepurat. Južiji, prisjevanjs:   |
| Bulweed District 1997 is<br>equilable practic  | committed to carring relationships,<br>ex. and high activesement for all | El Distrito Escalar II<br>solidarias, prácticas  | Posta compromitido en ostablecor relaciones<br>o quitation y el alto rendimiente para todos.   |
| Unitary       Unitary  |  | HURA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HARANA<br>HA | <section-header><section-header><section-header><section-header><section-header><section-header><section-header><section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header></section-header> |
| Academic standards and cu     Curriculum Advisory Commit     Progress forward strategic ge   | jann<br>issian signment<br>In (CAC) member internation<br>site           |  |  |
| * 3032-3023  |  |  |  |
| <ul> <li>accurate a construction and a construction of the con</li></ul> |  |  |  |
| <ul> <li>Annual Report</li> <li>2020-2021</li> <li>2019-2020</li> </ul>  |  |  |  |
| . 3016 3010  |  |  |  |

The curriculum team reviewed several types of data to help identify patterns in achievement and high school course enrollment. Specifically, the team reviewed these areas;

← The Strategic Framework portion of the ISD 197 website that has the last four years of 197's annual reports, which will include MCA and FAST data, along with other relevant information that could be useful for our study (graduation rates, college readiness, Pre-K readiness, etc). Source: <u>https://www.isd197.org/district/strategic-framework</u>

Additionally, the review team explored national and district level results on Advanced Placement exams in the area of mathematics.

State-wide performance data through the MN Report Card  $\rightarrow$  which provides a very large amount of data, including but not limited to:

- MCA results (by site, grade, demographic), and can be viewed in comparison with other districts/schools.
- Graduation data
- Progression for student groups.

Source: https://rc.education.mn.gov/#mySchool/p--3



| - MENO                   |   |                         |                     | Minnesota SLEDS  |
|--------------------------|---|-------------------------|---------------------|--|
| Information              |   | De                      | velopmental E       | ducation: How many high school graduates enroll in developmental education |
| Home                     | West St. Paul-Mer                         | dota Heights            |                     |  |
| Outreach                 | Eagan<br>High School Graduation Y         | lear: 2021              | Q-                  | + Add another view   |
| Research                 | Developmental Educ                        | ation Enrollment        | 0                   |  |
| Privacy                  | Percent of HS Graduat                     | es Enrolled in          |                     |  |
| Data in Use              | During First Two Years                    | ion at a Minnesc        | ita College         |  |
| Learning                 | 102%                                      |                         | ====                |  |
| High School Graduates    | 758                                       |                         |                     |  |
| High School Academics    | 52N                                       |                         |                     |  |
| Enrollment               | 200                                       |                         |                     |  |
| Completing College       | 238                                       |                         |                     |  |
| Developmental Education  | ON Statewide                              | West St. Faul-Me<br>Tep | ndata Heights-<br>M |  |
| Out of State Enrollment  |   | w                       | est St. Paul-       |  |
| Course Taking            |   |                         | Mendota<br>Heights- |  |
| Rigorous Course Taking   | Type<br>Percent of HS                     | Statewide<br>9%         | Eagan<br>9%         |  |
| Electives to ACT Results | Graduates Enrolled<br>in Developmental    |                         |                     |  |
| Entering the Workforce   | Education in First<br>or Second Fall Term |                         |                     |  |
| College Students         | Average Credits of<br>Dev Ed Attempted    | 4.83                    | 4.55                |  |
| New Student Demographics | for Students<br>Enrolled in Dev Ed        |                         |                     |  |

← Post-secondary success and participation (MN SLEDS) This website includes data which focuses on outcomes for students that connect to post-secondary success while in high school, as well as students' choices once they leave high school. This data includes;

- Developmental Education
- Completion of college
- Post-secondary institutions attended

Source: <a href="https://sleds.mn.gov/">https://sleds.mn.gov/</a>

| DOL DISTRICT 197     |           | Math                   |   |
|----------------------|-----------|------------------------|---|
|                      | Fall 2021 | Spring '21 (Fall 2022) | End of Quarter 1  |
| CIS Algebra          | 20%       | 62.8% (Fa 59%)         | 58.1%<br>Up ~38% from Fall '21<br>Down ~5% from Spring<br>Down ~1 % from Fall '22   |
| Math for Trades      | 45.5%     | 37.6% (Fa 21%)         | 23.1%<br>Down ~22% from Fall '21<br>Down ~14% from Spring<br>Up ~2% from Fall '22   |
| AP CompSci Principle | 50%       | 46.7% (Fa 39%)         | 33.3%<br>Down ~17% from Fall '21<br>Down ~13% from Spring<br>Down ~6% from Fall '22 |

← (Example) Participation Measures: Multiple years worth of enrollment data, disaggregated in multiple ways across all math courses at the high school level were reviewed.

Many of the observations and insights that the review team noted while conducting this review of various types of data are included in either the strengths and weaknesses or the four-way equity test sections of this report.

Examples of some of the observations and insights that the review team identified are included below:

- Math MCA Proficiency-we were #2 when compared to 10 comparable school districts to ISD 197.
- Grade-level proficiency decreases over time across the grades and overall proficiency rate is below the state standard.
- Our comparable districts are struggling too when comparing MCA results.
- Using FAST aMath to measure student growth is encouraging.
- It is difficult to look at trends in data with the disruption due to COVID 19.
- How might some of the trends be impacted in future years as we're seeing more gaps, needs, and foundational skills that are lacking.

## Educational Equity Analysis / Four Way Equity Test

Throughout the entire curriculum review process, the team was charged with routinely asking how the questions included in the Four Way Equity Test could be used to address findings from each particular stage in the review process. Examples for how this work was integrated throughout the process are noted below.

For reference, the Four Way Equity Test questions are provided below as well:

- 1. Does this help to provide opportunities for students who have historically been underserved, underrepresented, or disadvantaged by the current system?
- 2. Does this help to ensure equitable access for all?
- 3. Does this help to eliminate barriers based on gender, race/ethnicity, national origin, color, disability, age or other protected group?
- 4. Does this ensure the same rigorous standards for academic performance exist for all students?

Who benefits or experiences advantage in our current K-12 math program? What is the impact on this group of people?

- Students of various learning styles our current curriculum has hands-on, digital, and paper/pencil options for learning math.
- Students who need extra help are benefitted by additional support and students who are ready for it have the opportunity to take accelerated classes.
- Students who enter and continue in an accelerated track are able to take high level math courses. Students have the opportunity to enter an accelerated track at any point after 4th grade.
- Students who advocate for themselves, are strong in math, and students who have support at home.
- Based on our achievement data white students typically achieve at higher levels in math than our students of color.

Who is disadvantaged? What is the impact on this group of people?

- EL Students many ELL students have skills in math in their home language. Translating that to a new language and being expected to do it at the same pace as their English speaking peers poses a challenge for these students. A subset of our EL students are brand new to the country this has been especially challenging at the middle and high school level with more advanced math concepts.
- Students who struggle with math and are afraid to ask for help, who do not have support at home, and students who may enter our schools mid-year.
- Students of color are clearly disadvantaged here as our achievement data shows.
- Teachers with multiple preps because lessons are not always ready-made
- Students who have gaps in their foundational skills that make it hard for them to do grade-level coursework.

How are these systemic or institutional issues? Why haven't the issues been addressed? OR, how have the issues begun to be addressed?

- They are starting to be addressed we see and know the problems and are in the process of learning and growing
- Intervention resources not equitably available elementary school math intervention has been left to each building and do not necessarily match in terms of number of children served, resources used, and progress monitoring methods. A focus on this for the 23-24 school year has been identified by the elementary principals.

How can we maximize who experiences benefits and minimize who experiences disadvantages?

- Increase staff diversity
- Eliminate tracking/ability grouping
- More access to math intervention
- Provide time for teacher collaboration
- EL support/training on English Learner teaching strategies

## **Next Steps**

In year two of curriculum review we will:

- Unpack benchmarks into grade level learning targets (K-12).
- Conduct an instructional materials review process, ideally to be completed by spring 2024 (K-12).
- Conduct any product exploration necessary to help make determinations on instructional resources, as needed.
- Develop a plan to meet implementation expectations for 2027-2028 (K-12).
- Identify professional development needs for providing instruction in updated standards (K-12).
- Review the implementation of math intervention at all five elementary schools. Work to provide resources, progress monitoring and data driven decision making. (K-4)
- Update the high school course sequence as needed to meet state and local requirements.
- Explore post-secondary opportunities for college and career coursework, particularly in the areas of concurrent enrollment options.

## **Appendix A: Math Review Team**

| Team Member        | Title                                   | Site                         |
|--------------------|---|------------------------------|
| Kari Redding       | Kindergarten teacher                    | Somerset Elementary          |
| Darcy Huspek       | Grade 1 teacher                         | Garlough Elementary          |
| Ashley Mossey      | Grade 2 teacher/Instructional Coach     | Moreland Elementary          |
| Rodrigo Sanchez    | Grade 3 teacher                         | Garlough Elementary          |
| Samantha Schiltz   | Grade 4 teacher                         | Mendota Elementary           |
| Joann Cudo         | Elementary Special Education            | Pilot Knob Elementary        |
| Heidi Chun         | Elementary English as a Second Language | Garlough Elementary          |
| Brianna Fank       | Grade 6 teacher                         | Heritage Middle School       |
| Ryan Power-Theisen | Grade 5/6 teacher                       | Friendly Hills Middle School |
| Emily Berghuis     | Grade 7 teacher                         | Heritage Middle School       |
| Hope Alger         | Grade 8 teacher                         | Friendly Hills Middle School |
| Jim Bruder         | Two Rivers teacher                      | Two Rivers High School       |
| Heather Hagen      | Two Rivers teacher                      | Two Rivers High School       |
| Jess Emery         | Two Rivers ESL teacher                  | Two Rivers High School       |
| Jessica Cabak      | Associate Principal                     | Two Rivers High School       |
| Kate Skappel       | Elementary Curriculum Coordinator       | District Office              |
| Miles Lawson       | Secondary Curriculum Coordinator        | District Office              |

## **Appendix B: Survey Questions**

The review committee drafted the following questions for the curriculum review survey. The questions are similar in nature to other areas of curriculum that have gone under review in the past. In addition to the questions listed below we also asked some general demographic questions to help us disaggregate the data.

#### 2022-23 Math Review: Staff Survey

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|-----------------------|--|-----------|--|
| <br>                  |  | en (18. e |  |
|                       |  | ~ ~       |  |
|                       |  |           |  |
|                       |  |           |  |

1. Which school do you teach al? \*

Mark only one oval.

- C Garlough
- Mendota
- Moreland
- O Pilet Knob
- () Somerset
- C Friendly Hills
- Heritoge
- Two Rivers
- reactions
- O More than one achool

2. Which grade/course do you teach? Check all that apply.\*

Check all that apply

Kindergarten Grade 1 Gride 2 Grade 3 Grade 4 Grade 5 Grade 5 Accelerated Grade 5 Intervention Grade 6 Grade 6 Accelearated Grade 6 Intervention Grade 7 Grade 7 Intervention Grade 8 Grade B Intervention Linear Algebra IL HS Pre-Algebra D. Intermediate Algebra Interredicte Algebra Geometry Conceptual Geometry Algebra II Conceptual Algebra 8 Algebra II with Trignometry 145 Elective: Intermediate Algebra Support 165 Elective: PreEnfculus HS Elective: AP Statistica HS Elective: AP Calculus AB Bits Elective: AP Calculus BC HS Elective: Analysis BE Elective: College in the Schools Algebra HS Elective: Math for Tradea HS Elective: Introduction to Computer Science HS Elective: AP Computer Science Principles HS Elective: Computer Science and Information Technology CAPS Other

Reflections on current approaches for instruction and instructional materials.

 What are the strengths of your current math instructional resources? When responding, please use the instructional resources listed below as your traine of reference.
 K - 1: Bridges
 Gir 2 - 6: Go Math
 HS required courses: Big Ideas What are the strengths of your current math instructional resources for nongraduation required courses at the high school?

 What are concerns of your current math instructional resources for non-graduation required ocurses at the high school?

 What are your concerns about your current math instructional resources? When responding, please use the instructional resources listed below as your frame of reference.
 K - 1: Bridges
 Gr 2 - 8: Go Math

HS required courses: Big Ideas

What kinds of activities work best with your students and/or what kinds of activities do you use most often?

What are the most important parts of a math curriculum? Please rank each component below 1 through 5.

#### 8. Manipulatives/Hands-on Activities



#### 10. Consumable Workbooks





#### 11. Real-life Applications

9. Practice Sets or Print Resources/Templates





#### 12 Differentiation (Reteach/Enrichment)

13. Online Assignments/Assessments



#### 14. Digital Resources for Students

Attant only one ovail.

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#### 15. Parent Resources

#### What level of agreement do you have with each of the following statements?

- 16. I am able to get through the math standards for my grade level/course in a school year.
- 17. I feel the instructional materials (Bridges, Go Math. Big Ideas) are aligned to the standards in my grade/course.

Strongly Agree

Strongly Disagree

Mark any are eval Strange Agree 1 2

000

Strongly Disagree

 I feel the current instructional resources offers (Bridges, Go Math, Big Ideas) enough opportunities to meet the needs of all students.



19. I regularly use district provided supplemental materials (ie. DreamBox, D0,) to meet the needs of my students.



20. T regularly use teacher created/found supplemental materials to meet the needs of my students.



22. Is there anything else you would like to share with the K-12 Math Curriculum Review Committee to help them guide their work? Below are some examples to get your thinking started.

Are there examples of innovation that you are curious about as it relates to math education that you would like the team to explore?

Are there specific and significant areas of concern you would like them to address?

What do you see as the 1 or 2 single biggest issues that our team should consider investing time on that you think would have the biggest positive impact on our students outcomes in math?

#### General Input

The content is migher created nor endered by though

21. Do you have adequate resources to meet the needs of all students? If not, what resources are needed to be able to do so?



Google Forms

## **Student Survey**

## 2022-23 Math Review: Student Survey

Thank you for taking the time to complete this survey. The feedback you provide our ourioulum review team will be helpful as we begin developing plans for math programming in future years.

**Click NEXT** to continue \* Indicates required question

Sky to purebon 7

School

1. Which school do you go to? \*

Mark only one oval.

C Gerlough Mendota Moreland Plist Knob Somerset O Friendly Hills Hertoge

Two Rivers Skip to question 14

#### Skip to question 2

Math Grade/Course

| H8 Elective: College in the Scho | oois Algebra    | Skip to question 73 |
|----------------------------------|-----------------|---------------------|
| HS Elective: Math for Trades     | Skip to quest   | ian 13              |
| HS Elective: Introduction to Co  | regular Science | Skip to puestion 1  |

HS Bootive: AP Computer Science Principles Skip to question 19

HS Dective: Computer Science and Information Technology CAPS

Skip to question 13

The questions below are not required. However, if you feel comfortable completing them, we do feel they will help our math team while they do their work in their curriculum review over the next few years. This information will help us understand the needs and priorities of specific groups of students.

3. Which race/ethnicity do you most closely identity with?

Mark only one oval.

C American Indian or Alaska Native

- () Asian
- Black or African American
- Hupanic or Latino

Native Hawailan or Other Pacific Islander

- Two or More Roces
- O White

4. I currently receive English Language (EL) services at my school.

Mark only one oval. ⊖Yes ON9

Union

2. Which grade/course are you currently in this year? \*

Mark only one oval.

Kindergarten Skia to questice 7 C Grade 1 Skip to avestion 7 Grade 2 Skip to question 7 Grade 3 Skip to question 7 Conside 4 Skip to guestian 7 C Grade 5 Skip to question 18 Grade 5 Accelerated Skip to question 13 Grade 5 Intervention Skip to question 73 Grade 6 Skip to question 18 C Oracle 6 Accelearated Skip to question 73 Grade 6 Intervention Skip to question 7.1 Grade 7 Skip to question 13 Corade 7 Intervention Skip to question 13 Grade 8 Skip to guestian 12 Grade 8 Intervention Skip to question 73 Unear Algebra Skip to question 13 EL HS Pre-Algebra Skip to guestice 73 EL Intermediate Algebra Skip to question 73 C Intermediate Algebra Skip to question 13 Geometry Skip to guestion 13 Conceptual Geometry Skip to guestian 12 Algebra it Skip to question 12 Conceptual Algebra II Skip to question 17 Algebra II with Trignometry Skip to question 13 H8 Elective: Intermediate Algebra Support Skip to guestion 12 HS Elective: PreCalculus Skip to question 7.3 CITY In the statistical Skip to guestice 73

- HS Elective: AP Calculus AB Skip to guestion 18
- HS Elective: AP Calculus 80 Skip to avestion 18
- HS Elective: Analysis Skip to question 73
- 5. I currently have an IEP and I receive Special Education services at my school. Mark only one oval.
  - C) Yes ON Unaure

6. I currently am, or have in the past, received Gifted and Talented services at my school(s).

Mark only one oval.

| C | 0 | Yes    |
|---|---|--------|
| Ċ | 5 | No     |
| ¢ | D | Unsare |

Skip to guestion 2

Information about your experiences in learning math.

- 7. Rate your confidence in the following areas (scale 1 to 4).
  - Mark only one oval per role

|                                | i can<br>do thia,<br>but i<br>need<br>ict of<br>help | i can<br>do this<br>with a<br>little<br>bit of<br>help | Ican<br>dothis<br>on my<br>own | l can do<br>this and<br>teach<br>someone<br>aloa |
|--------------------------------|--|--|--------------------------------|--|
| Completing<br>math<br>homework | 0  | 0  | 0                              | 0  |
| Taking a math teat             | 0  | 0  | 0                              | 0  |
| Talking<br>about math          | 0  | 0  | 0                              | 0  |
| Writing<br>about math          | 0  | 0  | 0                              | 0  |

#### 8. How do you best learn math? (check all that apply)

- Dreak all that appl: Teacher whole-group lossen Working on white loants Small group work Binal group work Worksheets Worksheets Game apps Origital learning tools (Dreambox, INL, Desmos, Khan Asademy, Akks) Cither:
- 12. What do you do when you have to solve a difficult or challenging math problem? Check all that apply.
  - Check all than apply. Ask my teacher Ask someone at home Ask is tiend Tectbook Differe teatbook Differe teatbook
  - Keep trying until figure it out an my own

#### Skip to question 75kip to question 1

#### Math Pathway

13. This question is for any student in grades 5-12.

#### What math class did you take in 5th grade? Mark only one oval.

- Math 5 (traditional 5th grade math class) Skip to guestion 7
- Accelerated Math 5 Skip to guestion 17
- C I did not attend achool in this achool district Skip to question 7
- I don't remember which math class I took
   Skip to question 7

#### High School Only

#### 9. Which THREE activities do you do most often in math class?

Check all faits apply: Treacher vehale-group lesson Norseidong Working on white boards Small group work: Institution of the second Worksheets Varian Game apps Gigta Learning Isola (Dreambon, IKI, Deamar, Khan Academy, Aleka) Onton:

#### 10. How much time do you spend on math homework per day?

Mark only are ceal 0 min 8-15 min 20-25 min 40-60 min 0 ver an hear

## 11. Are you able to finish your homework at home?

#### Mark only one oral

- main only one oral.
- Ves, always Ves, sometimes
- No. not usually
- No.never
- I don't ever have math homework
- I complete my math homework at school

#### 14. This question is only for current high school students.

Students are required to complete three years of math at the high school by the state and our district, however colleges and universities may require four years. Are you currently planning on taking math all four years before graduating?

#### Mark only one oval.

- \_\_\_\_ I don't know yet
- I will likely take the three required years of math only
   I will likely take four years of math

#### 15. This question is only for current 12th grade students.

Will you have taken 4 years of math by the time you graduate from high school? Mark only one ceal.

#### Ves

No-1 had not been planning on taking more than the required three years of math. No-Originally I was planning to, but have since changed my mind.

#### 16. This question is only for current 12th grade students.

Why did you make the choice you did for the previous question?

Accelerate Math Pathway Feedback

#### 17. You indicated that you took Accelerated Math 5 as a 5th grader.

We would love to hear how your experience has been so far. In the space below, please provide two benefits, and two challenges, of being in accelerated math opportunities, beginning in grade 5.

Ship to question 7 Untitled Section

This contact is written invaluel nor endereed by Goegle.

Google Forms

## **Parent/Family Survey**

 $\delta$  . How do you know what your student to learning about in math? Choose all final  $^{-+}$ 2022-23 Math Review: Family Survey pas-conceptench / Revisión sobre Matemáticas 2022-23: Direct all that says in Encuesta familiar Linear de la després de la destrucción de la mestación sera la des la desa de la desa de la desa de la desarra desarra de la desarra desarra desarra de la desarra desa the and and ing the input from the observation in both set is swimming our result surfacebone of all finds in TL Phase complete the survey on later from Philos, January 10th Induces a solicitado aportes de los feceles para epóderos a revisor ciantes emanas de plas de estados de materálicas en todos los sterios 8.12. Complete la encanda a vais lação el vienera, 13 de plana. Introduction to service in succession. nal necessary or resolutions, provident para since or source compare compares presents para metrics, annual or of relation provident in therming to result, and soft ware proto to find and relations and thermity proton field in the indexidence of the grant of the source of the so 1. Do you have a children in elementary achool? \* (Totas un trimala) en la escuela primaria? Mail only one coal Charle days passed Che Macqueene Elementary Students, / Estudiantics do primaria Product answer Agency positions when Working about poor official to in interacting with the factor responsibilities preparation matching attention on the lattice (c) in the result is prime thend all that sparts 2 How shar are Annework guidelines apecific to math homework? Gub ter climes oon his pluites expectings para in term de meterationer Med and the seal the chief is all shere contrast / he will chear in blockle - simple contrast. 1.0 10 .0 Mark only one coal. Technings is leave that is used any fire tight amount of a techning pare appropriate memory assembles as a use in its certifications. Technings is been wait to used near other has rescaled. If a terminative pare optical memory assembles are as controls. Areased as the assesses. . 0 Vep instruction (Mig-sheat- in provide Ribble School/Escoals Hormodia Do peur have a children in middle school? \* «Tare hijnigd on is oppials intermodia? Marit only not coal

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#### High School Questions (Progettal astro to excusive ecundaria)

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Appendix C: Math Standards Changes (2007 to 2022)

| Grade K | Data Analysis: (0 $\rightarrow$ 2 standards)   |
|---------|--|
|         | <ul> <li>All completely new</li> <li>Spatial Reasoning: Previously Geometry/Measurement (5→6 standards)</li> <li>Compare objects with a measurable attribute in common; which object has 'more of', 'less of' or the 'same as' attribute. Explain reasoning.</li> <li>Compose, decompose and name simple shapes - recognize regardless of Patterns and Relationships: Previously Number &amp; Operation/Algebra (8→12 standards)</li> <li>Count collections of objects up to 31 by grouping in 10's, ten-frames, cups or other tools.</li> <li>Compare and order is added to read, write and represent whole numbers</li> </ul>  |
|         | <ul> <li>Count forward to 31 (previously 20) and back from 20.</li> <li>Compose and decompose numbers (previously to 10) less than or equal to 10 into pairs in more than one way with objects and pics. Record each decomposition with a drawing or equation.</li> <li>Fluently add and subtract within 5.</li> <li>Identify whether the number of objects in a group is greater than, less than, or equal to (these terms are new).</li> <li>Recognize that the equal sign is a comparison symbol of two math expressions of equal value number.</li> <li>Recognize (previously identify), create, complete, &amp; extend patterns.</li> <li>Recognize patterns in counting- skip count by 10s starting at zero up to 100.</li> </ul>  |
| Grade 1 | <ul> <li>Data Analysis: (0→ 3 standards)</li> <li>Data analysis is completely new.</li> <li>Notice &amp; describe patterns in data and create investigations to collect data with teacher guidance.</li> <li>Use data to answer a question. Represent data as drawing, tally marks, bar graph.</li> <li>Describe outcomes as impossible, possible, or certain.</li> <li>Spatial Reasoning: Previously Geometry/Measurement (5 → 7 standards)</li> <li>Ordering and comparing 3 objects by length &amp; attributes and ability to explain relationships &amp; reasonableness of measurement.</li> <li>Describe objects in the environment using names of shapes and describe relative positions using left and right.</li> <li>Identify shapes regardless of their orientations.</li> <li>No telling time standards.</li> <li>Patterns and Relationships: (15 →18 standards)</li> <li>In the "Read, write, represent" benchmark, expanded notation is added.</li> </ul> |

|         | <ul> <li>Count collections of objects using groups of 5s or 10s.</li> <li>Estimate amounts up to 120 using benchmarks of 5s and 10s.</li> <li>Add within 100, including adding two-digit numbers to a multiple of 10 and the understanding that sometimes it is necessary to compose a new ten.</li> <li>Fact fluency of addition and subtraction within 10.</li> <li>Use combinations of 10 to add to the next decade.</li> <li>Determine the double of any single digit number (previously fit in with addition/subtraction standard, now is isolated).</li> <li>Represent and solve situations with equal sharing among 2 groups. Name a fractional amount using the word "half".</li> <li>Comparing two two-digit numbers (isn't new but it specifies the need to compare in terms of tens and ones).</li> <li>Skip count by 10s starting at a non-zero number (previously 10 more and 10 less).</li> <li>Describe what is changing and what is staying the same in a visual growing pattern.</li> </ul>  |
|---------|---|
| Grade 2 | <ul> <li>Data Analysis: (0→ 5 standards)</li> <li>All completely new.</li> <li>Data Sciences is all new.</li> <li>Chance and Uncertainty is all new.</li> <li>Spatial Reasoning: Previously Geometry/Measurement ( 6 → 10 standards)</li> <li>New: <ul> <li>Partition a rectangle into rows and columns of same size squares and count the total number.</li> <li>Represent whole numbers as lengths from 0 on a number line with equally spaced points corresponding to the numbers.</li> <li>Represent whole number sums and differences within 100 on a number line.</li> <li>Use addition and subtraction within 100 to solve contextual situations involving lengths that are given in the same units using drawings and equations with a symbol for the unknown number to represent the situation.</li> <li>Measurement used to be understanding the relationships to now measuring with multiple tools and identifying the appropriate tool to use.</li> <li>Measurement: from measurement of lengths to comparing measurements of lengths.</li> <li>Create a representation for 2D and 3D shapes.</li> <li>Describe the location of an object in relation to another object.</li> </ul> </li> </ul> |

|         | Patterns and Relationships: Previously Algebra and Numbers and Operations (11+3         →16 standards)         • Changes:         • Representation of numbers has gone from 100,000 to 1,000         • Representation of numbers added expanded notation         • More written explanations         • Lots of situational/contextual situations         • More use of unknown numbers         • New:         • Count collections of objects using groups of 10s, and 100s to 1,000.         Represent the counting strategy and the total using words, symbols, and pictures.         • Lots of new contextual situations in relationships to written methods         • Fractions halves and fourths         • True/false open number equations         • Skip counting by 2's from any given number up to 120         • Use numeric expressions to describe a visual growing pattern         • Use patterns to solve situations in various contexts         • Everything in equivalence and relational thinking is new |
|---------|--|
| Grade 3 | <ul> <li>Data Analysis (1→6 benchmarks)</li> <li>Is now broken up into separate standards</li> <li>Geometry and Measurement → Spatial Reasoning (9 → 5) <ul> <li>New:</li> <li>Measure to nearest ¼ unit (was measure to nearest ½ unit)</li> <li>Compare and contrast measurement units within one system (e.g. inches to feet, cm to m)</li> </ul> </li> <li>Changes: <ul> <li>No more time standard (Old: current and elapsed to the nearest minute)</li> </ul> </li> <li>Patterns and Relationships: Previously Algebra and Numbers and Operations (16→18 standards) <ul> <li>New:</li> <li>More specific in what is the benchmark (Some are build on top on another and get a bit more in depth)</li> <li>More visual focus when it comes to fractions, read and write fractions o Fractions up to 2</li> <li>More justifications of reasoning</li> </ul> </li> </ul>   |
| Grade 4 | <ul> <li>Data Analysis: (1→ 6 Benchmarks)</li> <li>New:</li> </ul>   |

Adds in "considering cultural perspectives" and is broad for numbers. 0 Adds in "Chance and Uncertainty" anchor standard. 0 Patterns, statistical questions, variability, missing/incomplete bias, Ο double bar graphs, line plots, spreadsheets. Probability - specifically with dice, coins, spinners, and numberline. 0 Spatial Reasoning: ( $10 \rightarrow 12$  benchmarks) New: • Measure to sixteenth of an inch & tenth of a cm. Ο Make change up to \$20 using \$ &¢ appropriately. Ο Draw points, lines, line segments, rays, angles and perpendicular and 0 parallel lines. Identify these in 2D shapes. Create triangles on sides (scalene, isosceles, equilateral) and angles (acute, right, obtuse) Changes: removed all Translations Benchmark  $\rightarrow$  moved to 7th Grade 0 Patterns and Relationships:  $(13+3 \rightarrow 22 \text{ benchmarks})$ New • Compare and order whole numbers from 0-1,000,000 with place value 0 understanding, number lines and other tools Estimate sums and differences, within, 1,000,000 Ο Use the four operations to make financial decisions based on income, Ο spending, saving, credit and charitable giving Changes "Real world" changed to "contextual situations" 0 Number line fractional values between 0-3, including mixed numbers Ο and fractions greater than 1 with denominators of 2,3,4,5,6,8,10,12. Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers Explain why a fraction a/b is equivalent to the product a x 1/b using 0 visual models and language Explain why a fraction a/b is equivalent to a fraction nxa/nxb by using a 0 visual models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size) Use visual models to add/subtract fractions with denominators of 2,4,8 0 with results up to 2 Open number sentences Ο Determine if the equation is true/false and justify your reasoning Ο Use words to write a rule for multiplicative patterns to solve contextual Ο situations - including tables, drawings, and algebraic equations Removed Input/Out  $\rightarrow$  moved to 3rd Grade\*\* Ο

## Middle School

| <u>Math 5</u> | <ul> <li>Data Analysis:</li> <li>"notice and describe patterns in data-rich situations",</li> <li>Recognize qualitative and quantitative</li> <li>Compare and contrast different data displays</li> <li>List outcomes of probability experiments</li> <li>Use frequency tables to make predictions</li> </ul>  |
|---------------|--|
|               | Spatial Reasoning: No difference   |
|               | <ul> <li>Patterns and relationships:</li> <li>Multiplying fractions (5.3.5.14)</li> <li>Multiply a whole number with a fraction/ find a fraction of a whole number (5.3.5.15)</li> <li>Whole number divided by a fraction (5.3.5.16)</li> <li>Different ways of paying (5.3.5.18)</li> <li>"use the four operations to create an individual or group budget based on wants and needs" and explore debt and long-term impact (5.3.5.19)</li> <li>Rules for number of items in figure n (5.3.7.5)</li> </ul>                                   |
| <u>Math 6</u> | <ul> <li>Data Analysis:</li> <li>Includes probability</li> <li>More emphasis on creating questions, designing experiments, and collecting and interpreting data. (6.1.1.2)</li> <li>Addition of statistical questions and variability (6.1.1.1)</li> <li>Addition of identifying and determining measures of center (6.1.1.3)</li> <li>Addition of visualizations of tables, dot plots, stem-and-leaf plots, histograms, and box plots (6.1.1.4)</li> <li>Addition of comparing and communicating data trends (6.1.1.5).</li> </ul>          |
|               | <ul> <li>Spatial Reasoning:</li> <li>Essentially our old geometry &amp; measurement standards.</li> <li>New benchmark (6.2.4.3) on drawing polygons in the coordinate plane and determining length of sides</li> </ul>   |
|               | <ul> <li>Patterns and Relationships:</li> <li>Now includes negative numbers when it comes to opposites, plotting on a number line, and inequality events. (6.3.5.1, 6.3.5.2, 6.3.5.3)</li> <li>Absolute value is now in 6th grade benchmarks (instead of 7th). (6.3.5.6)</li> <li>6.3.6.1 took out the language of associative, commutative, and distributive properties as well as order of operations (now in 4th grade standards).</li> <li>6.3.5.11 has the addition of concepts of discounts, markups, tips and commissions.</li> </ul> |

| Math 7            | Data analysis:  |
|-------------------|---|
|                   | <ul> <li>More emphasis on collecting data</li> </ul>  |
|                   | <ul> <li>Sampling (could use Go Math Module 10)</li> </ul>  |
|                   | <ul> <li>"Consider cultural perspectives": are generalizations valid/representative of</li> </ul> |
|                   | populations   |
|                   | <ul> <li>Probability is part of data analysis</li> </ul>  |
|                   | Spatial reasoning:  |
|                   | Calculate arc length  |
|                   | <ul> <li>Define pi as constant of proportionality</li> </ul>                                      |
|                   | Patterns and relationships:   |
|                   | Create a budget   |
|                   | <ul> <li>More emphasis on two step equations and inequalities (could take the current</li> </ul>  |
|                   | modules 6 and 7 and teach the entire module)  |
|                   | <ul> <li>Less on percents and proportions</li> </ul>  |
| Linear Alg (Gr 8) | Data analysis:  |
|                   | Variation   |
|                   | <ul> <li>"linear association" instead of "line of best fit"</li> </ul>                            |
|                   | Create data visualizations  |
|                   | Spatial reasoning:  |
|                   | • "Using similar triangles" to explain parallel slopes instead of "analyzing polygons             |
|                   | to determine the slopes of their sides"   |
|                   | Patterns and relationships:   |
|                   | <ul> <li>Repeat of simple and compound interest</li> </ul>  |
|                   | <ul> <li>Solve multi-step contextual situations comparing how interest rate and loan</li> </ul>   |
|                   | length affect the cost of credit  |
|                   | <ul> <li>Compare and contrast employment opportunities and payment methods</li> </ul>             |
|                   | <ul> <li>"Order of operations" is now "computational hierarchy of operations"</li> </ul>          |

## High School

| Data Analysis               | More explicit detail in the benchmarks   |
|-----------------------------|--|
| Spatial Reasoning           |  |
| Patterns &<br>Relationships | <ul> <li>More focus on financial math (loans, retirement plans, employer match)</li> <li>Matrices added (9.3.5.4)</li> <li>Piecewise and step functions added (9.3.7.6)</li> </ul> |