



Date: February 19, 2019

To: Board of Directors

From: Heather Parsons, Director of Curriculum and Instruction

Re: Mathematics Priority 2018-19

Objectives for Math Priority 2018-19:

- a. Update the board around efforts to strengthen math outcomes through improved Concrete, Representational & Abstract (CRA) instruction
- b. Report on teacher instructional improvement using CRA strategies
- c. Update progress of student fluency mastery

Overview:

Despite having some of the strongest math outcomes in the state for similar schools, Navigator has made a commitment this year to improving math instruction geared toward student conceptual understanding of mathematics. We have identified that our lowest performing students in math struggle to “visualize” the math which ultimately leads to increased confusion and decreased learning. To counter this we have aggressively implemented the process of Concrete-Representational-Abstract (CRA) instruction in which students learn to connect the concrete (manipulatives) and representational (visual drawings) to the abstract (formulas). This year Navigator has held over twenty hours of professional development for the math teams targeting strategies to implement CRA effectively. We have also worked with site leaders to help them understand this shift in math instruction to be able to provide targeted coaching. Despite the fact that fifty percent (4/8) of the math teachers at HPS and fifty-six percent (5/9) at GPS are new to Navigator or new to teaching math at their grade level, student results remain strong. We have seen growth trends for nearly all of our data points including STAR and NWEA MAP and our Navigator Illuminate assessments. This shows us that our focus on CRA, targeted coaching and professional development has supported the continued improvement of our math program. Lastly, we have added math fact fluency data to our weekly data analysis at the leadership level. To do so we have begun assessing student math fact fluency weekly to establish our baseline data for future year to year analysis and immediate skills interventions.

Student Outcomes

Navigator uses several formal data points throughout the year to measure students progress in mathematics. Additionally, teachers are trained to take informal data daily to provide constant monitoring of students progress and intervention needs. In this report, we will dive into the formal assessment results to date for the year including:

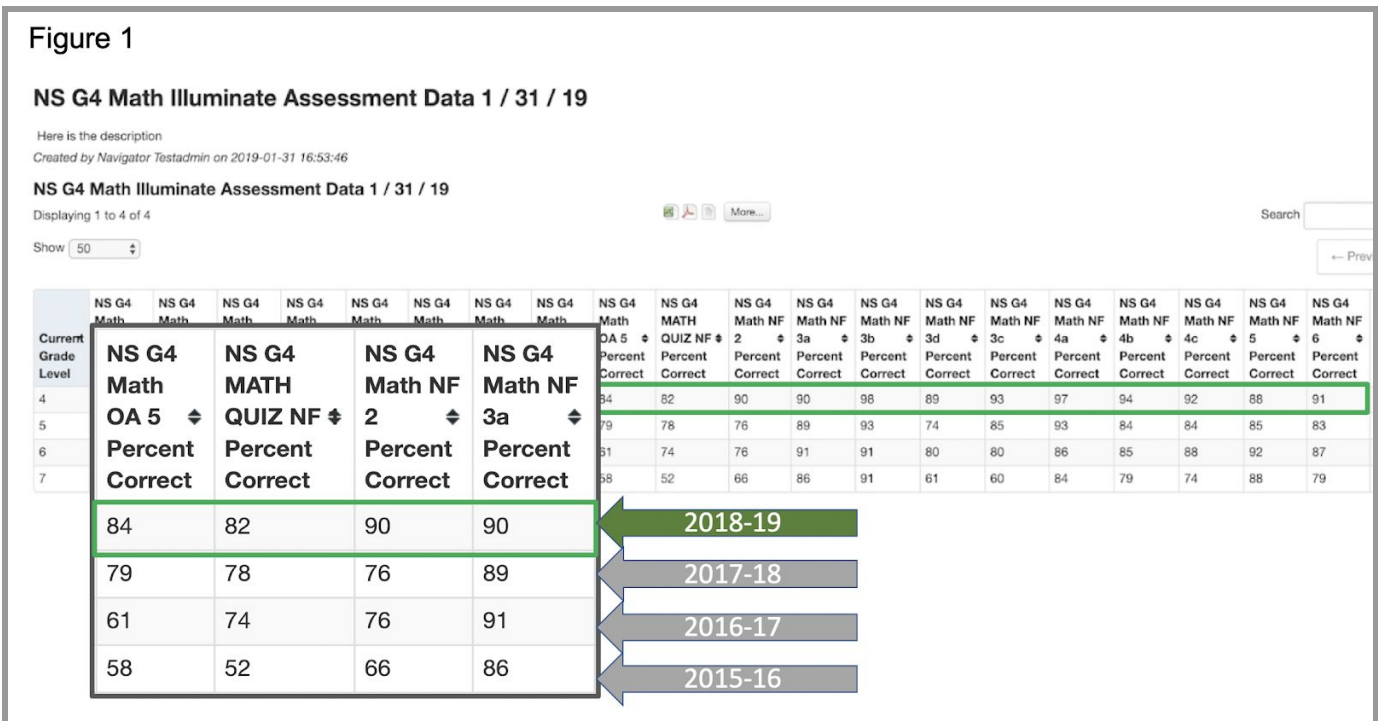
- Illuminate Weekly Quizzes
- STAR Math
- NWEA MAP
- Weekly Math Fluency

Illuminate Weekly Quizzes

Navigators internally developed weekly math quizzes are designed to assess student learning on the particular math standard taught that week. These formative assessments are developed and delivered through our Illuminate assessment system in grades K-8 and are designed to reach the rigor level of the SBAC. Illuminate provides a robust library of assessment questions for each standard that we choose from to build our assessments.

In grades K-5, these quizzes have been administered and vetted since 2014 and we place great value in their reliability to predict student success on the state's SBAC assessment. In our middle school, the quizzes are only in their second year of consistent use. Last year we ensured that all 6th-8th grade math standards had a quiz but teachers were not involved in their creation. This year has been the first year teachers have met to analyze and make iterations of the new assessments and we feel they will now be just as reliable as our K-5 assessments.

This year, due to our math priority, we spent time developing custom reports that could make longitudinal comparisons dating back 4 years in many cases. In Figure 1 you will see an example of what our site leadership teams now look at weekly to help them better target math coaching and professional development.



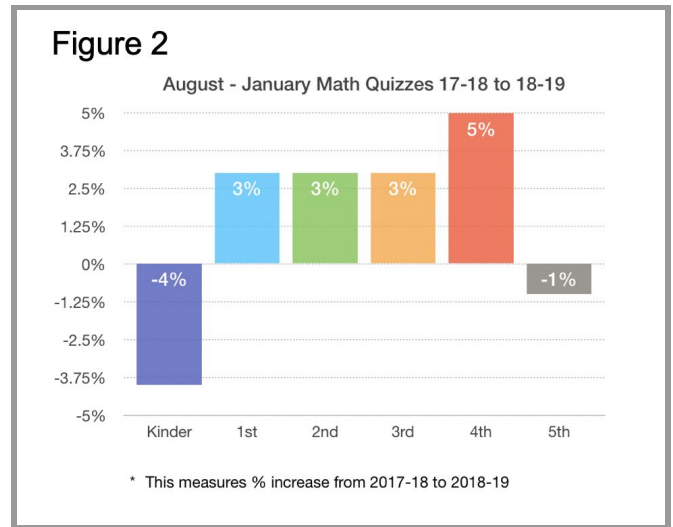
Analysis

We are pleased to report that that the comparison of this year's K-5 quiz scores to previous years suggest that students are again on track to the same positive outcomes on SBAC. Figure 2 shows an

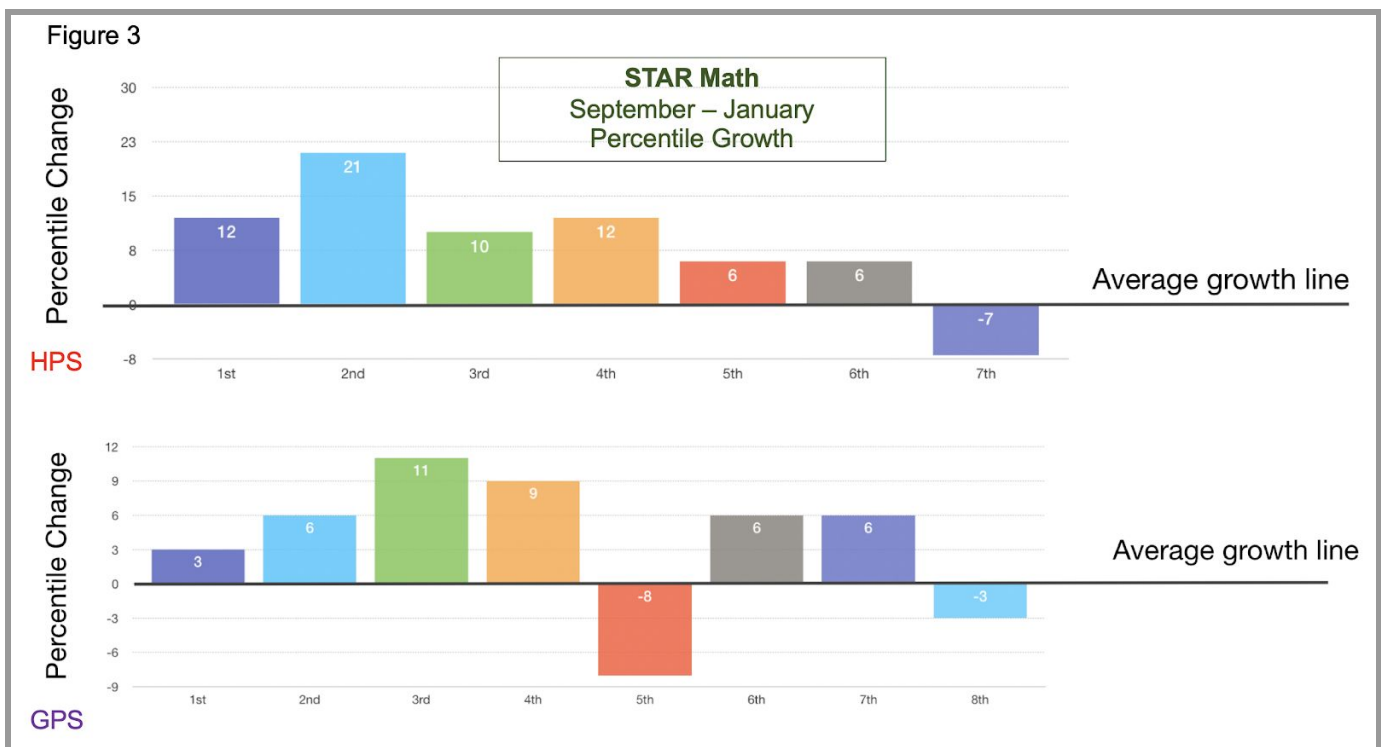
increase of 1.5% in our quiz score averages from 2017-18 to 2018-19. There was a dip in kindergarten and fifth grades that coaches at each site are addressing through increased live coaching and more frequent data meetings. We are looking at this year as our baseline year for grades 6- 8 due to assessment iteration.

STAR Math

The STAR Math assessment is a nationally-normed assessment used at Navigator to measure progress in the domains of numbers and operations, algebra, geometry, measurement and data analysis, and statistics and probability. The assessment is given four times per school year to gauge the mathematical knowledge and growth of students from 1st to 8th grade. In addition to monitoring growth and helping to create student instruction and intervention groupings, the STAR Math assessment can be used to test a student's readiness for state tests. STAR Math uses percentiles to compare student performance to other students that have taken the assessment. The percentile rank of a score is the percentage of scores in its frequency distribution that are equal to or lower than it. For example, a test score that is greater than 75% of the scores of people taking the test is said to be at the 75th percentile, where 75 is the percentile rank.



This year most grades at both schools have shown strong growth in their math percentiles (Figure 3). On a normed assessment such as STAR Math, the average percentile gain is zero. If a student is learning at a faster rate than the average student, their percentile score would rise. Conversely, a student learning at a slower rate than their peers would see a drop in percentiles. Both schools saw positive average percentile growth with GPS at a 3.8 percentile gain and HPS at an 8.6 percentile gain.

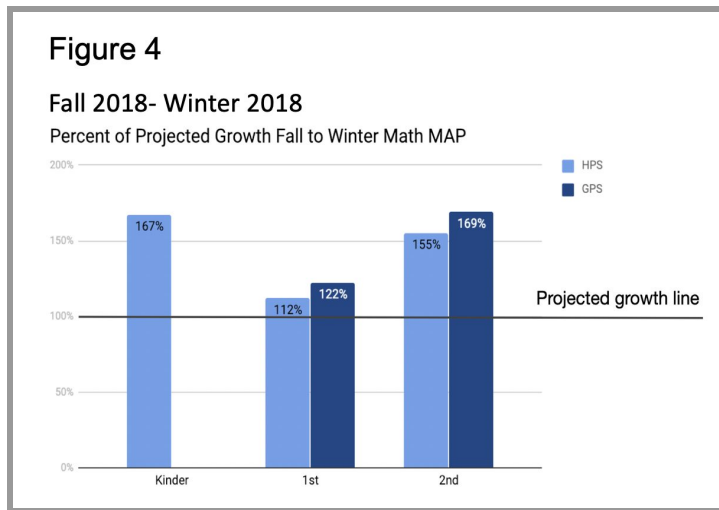


Next Steps:

STAR Math provides a second assessment demonstrating improvement of student learning in mathematics. It is also the second time that we saw a dip in fifth grade scores prompting both sites to increase support for the teachers in those classrooms. Grade levels or classrooms that have seen a drop in average growth are receiving targeted coaching around data, student work analysis, and intellectual preparation such as lesson planning.

NWEA MAP

MAP, similar to STAR Math is a nationally normed test that allows us to compare our students' growth to the growth of students across the country and this is the first year that Navigator has used MAP. One way MAP reports growth is the "percent of projected growth". Using this measure, if a student makes the expected growth from one test administration to the next, that student would be at 100% projected growth. If the percentage exceeds 100%, the student's learning is accelerated compared to the normed group and vice versa. Figure 4 shows that at both GPS and HPS exceeded the projected math growth in all grades. Please note, the winter assessment was optional this year in kindergarten and GPS students did not take the test. They will take the test in the spring and beginning next year, all three administrations will be mandatory.

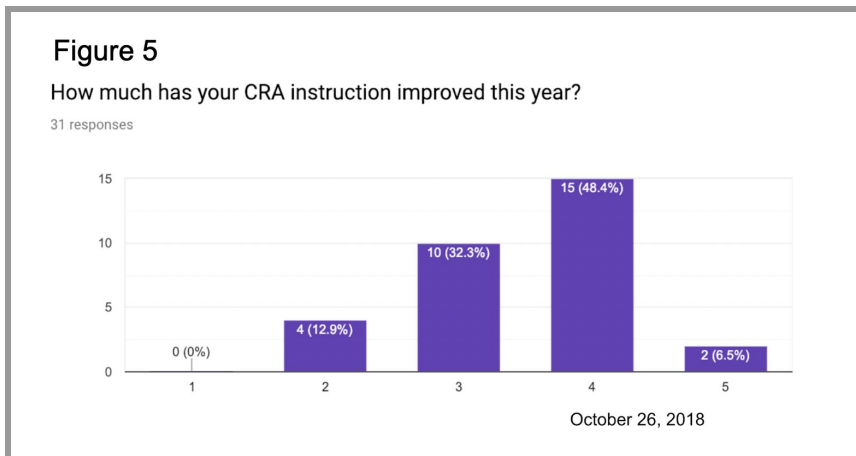


Analysis

NWEA MAP provides us a third data point showing that the strategies implemented for Navigator's math priority is having positive impacts on students' rates of learning.

Teacher Outcomes

In addition to an improved data review process, we augmented our professional development to include increased intellectual preparation for the concrete, representational and abstract (CRA) continuum. These professional development sessions were front-loaded at the beginning of the year to bring the entire staff up to speed on the concept of CRA. We have since transitioned into targeted coaching of math instruction to continue to develop our teachers' effectiveness in the classrooms



As you can see in Figure 5, this staff development and targeted coaching has positively impacted teacher's confidence in using the CRA strategies. Additionally, site leaders have reported a significant increase in use of the concrete and representational math strategies used by both teachers and students. Leadership teams at both sites have monitored the implementation of CRA through weekly walkthroughs and have spotlighted and reinforced best practices through coaching, morning huddle exemplars and data meetings.

Math Fluency

Math fluency is foundational for mathematical success. In the era of common core, it is often looked upon as lower level thinking and therefore not worthy of time. Yet just as reading fluency is critical to reading comprehension, math fact mastery frees students working memory to focus on problem solving in math rather than just calculating.

This year we provided professional development around fluency instruction and we have seen all math classes placing more emphasis on fluency instruction and data than in previous years. We also asked teachers to give weekly paper and pencil fluency tests and to record weekly student outcomes and an example is provided in Table 2. Navigator also switched to Reflex Math as a software support in an effort to increase student engagement and pilot new recommended programs.

Table 2
Math Fact Fluency Grade 5
Weeks 11 - 21

| Grade | Site | W11 | W12 | W13 | W14 | W15 | W16 | W17 | W18 BM | W19 | W20 | W21 |
|----------------------------------|------|---------|---------|---------|---------|---------|---------|---------|------------------|---------|----------------------|---------|
| 5th Multiplication / Division | | Div 2's | Div 3's | Div 3's | Div 3's | Div 4's | Div 4's | Div 4's | Div BM / 5's | Div 5's | Div 5's | Div 6's |
| | HPS | 91% | 76% | 78% | 90% | 83.3 | 91.5 | 89% | BM 83%/5's 88.8% | 96% | 96.50% | 84% |
| | GPS | 83% | 67% | 73% | 87% | 84% | 90% | 92% | BM 90%/5's 68% | 99% | Went back to 3's 87% | 80% |

Analysis:

To continue our math fluency efforts for the remainder of this year as well as next year we will:

- Continue to have teachers assess and record weekly fluency
- Review fluency data weekly at leadership level (Educational Leadership Meeting)
- Continue to define on our scope and sequence by grade with teacher input
- Develop appropriate and rigorous goals for each grade
- Develop and implement fluency intervention

Math Priority Next Steps:

We will continue mathematics as an academic departmental priority for at least one more year as our teams work to improve CRA continuum as well as the continued development of our fluency program and goals. We would like to research and study other outlying schools who are scoring at 80% or higher to help us further understand the best practices these schools are using to help their students achieve mastery.

1. Research the outlying schools in math proficiency and schedule visitations
2. Begin math fluency skills intervention and monitor effectiveness (April 2019)
3. Continue focusing on math CRA as a academic departmental priority for 2019-20
4. Potentially move this organizational priority to a departmental priority for 2019-20