2023-2024 Mathematics Advisory Committee Recommendation

TO: Arlington School Board
FROM: Mathematics Advisory Committee
DATE: December 13, 2023
SUBJECT: Recommendation for Math Interventionists to Help Our Struggling Elementary School Math Students
COMMITTEE CHAIRS: Todd Truitt, Chair; Greg Eastman, Vice Chair[1]
STAFF LIAISONS: Shannan Ellis, Carl Seward

RECOMMENDATION: Fund 15 Math Interventionists to be distributed across all grade levels at certain Elementary Schools (ES) with priority given to schools with the greatest need.

Staff Response: Staff fully supports this recommendation
Budgetary Cost: $2,677,500
Summary:

- Appendix A – *Rationale*, including:
  - ***Background information for understanding the need for ES Math interventionists***
    - COVID learning loss
    - Long-term equity gaps
    - Importance of early numeracy
    - Importance of Algebra readiness
    - Long-needed step toward budget parity with literacy
  - ***Concerning information regarding APS ES academic results in math, such as:***
    - Virginia Standard of Learning (SOL) results
    - Math Inventory (MI) results
  - ***How Math interventionists improve APS***
    - Improvements to math interventions for struggling students
    - Improvements to Tier 1 (i.e., classroom) instruction overall
    - Improvements to teacher retention and recruitment
- Appendix B – COVID learning loss and long-standing equity gap *graphs for math at APS*
- Appendix C – COVID learning loss and long-standing equity gap *graph for math nationally*
- Appendix D – *Chart* of number of students at *MI Below Basic by APS ES* at end of 2022-23SY
- Appendix E - *Graph of academic results* at APS ESs *with vs. without* interventionists

Strategic Plan Alignment

- PO-SS-1: Reduce opportunity gaps for all reporting groups on state assessments.
- PO-SS-2: All elementary school students will annually demonstrate growth by a minimum of one level using district assessments.
- S-SS-2: Deliver curriculum through innovative and relevant instruction that is differentiated to meet the diverse needs of each student.
- S-EW-1: Recruit, retain, and advance high-quality employees.
- S-OE-1: Manage available resources equitably.
- S-OE-2: Provide high-performance learning and working environments that support Universal Design for Learning standards.
- S-OE-4: Use long-term and systematic processes to ensure academics and operations are financially sustainable.
- S-OE-5: Systematically improve the quality of organizational operations.

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[1] The other members are: Rachel Whirley, Reginald O Robinson, Yun Kang, Michele Shepard, Marian Klymkowsky, Tralonne Shorter, Michael Steenhoek, Wesley Y Joe, Emily Cunningham, Peter Phelps, James Rohal, Joseph Pruitt, Kevin Wierzbicki, Umar Khan, Sara Gharahbeigi, Rachel Wegner

APPENDIX A
Rationale

A. Background Information for Understanding Need for Interventionists

1) ***COVID Learning Loss**:* APS students' math proficiency dropped sharply during COVID's wake. In the aftermath, teachers, students, and parents have had to adjust strategies to combat learning loss and move forward. Because of the disparate impact of distance learning and reduced class times, students have still not fully recovered. Learning deficits are sharpest among more vulnerable students, including English language learners, special education students, and low-income minority students. Learning loss in mathematics is particularly damaging because math courses build on the lessons taught in previous years. As these students move through school years, they will continue to be behind unless they receive proper intervention. ***See Appendixes B and C.***

2) ***Long-Term Equity Gaps:*** APS, like the US in general, has had long-standing equity gaps based on race and socioeconomic status in academic performance, including in math. Those gaps widened further in COVID's wake. But the existence of such gaps in general has been long-lasting, and such gaps were not improved by major math curriculum changes in the prior decade to emphasize more conceptual understanding (implemented principally via states' adoption of the Common Core and in Virginia as part the 2016 Math SOLs). ***See Appendixes B and C.***

3) ***Importance of Early Numeracy:*** Critically, early numeracy is the strongest predictor of student outcomes. Students who are unable to understand and process mathematics should be just as concerning as students who are unable to read. Numeracy is critical to everyday life, and APS must begin to treat it with the same sense of urgency as literacy.

4) ***Importance of Algebra Readiness:*** Successfully taking Algebra by 8th grade is an important milestone on the pathway to college, opening up space for more advanced math classes in high school. Moreover, civil rights leader Bob Moses of the Algebra Project advocated that such completion, and increasing the rate of historically underrepresented groups, is a civil rights issue. In fact, broadening the demographics of students who successfully complete Algebra by 8th grade is an equity goal for APS. Previous efforts to accelerate all students into Algebra by 8th grade, even those unprepared, did not succeed. As a result, most school systems' focus is on preparing as many kids as possible for Algebra by 8th grade, including APS. These efforts do not start in 6th or 7th grades, but must start as early as Kindergarten, and include getting ES kids who are behind academically back on track.

5) ***Long-Needed Step toward Parity with Literacy**:* In light of the importance of numeracy, APS' funding of numeracy has long-lacked parity with literacy, even though both are arguably of equal importance. A recent VDOE news release stated, "More than half of 3rd-8th graders either failed or are at risk of failing their reading SOL exam, and nearly two-thirds of 3rd-8th graders either failed, or are at risk of failing, their math SOL exam." The state is requiring schools to create a plan to address both concerns. Students, including those here in Arlington, are at greater risk in the area of mathematics.

B. Concerning APS ES Academic Results in Math

1) ***SOL Results:*** The share of students failing their mathematics Standards of Learning (SOLs) surged in the 2020-2021 school year, and despite movement in the right direction, failure rates remain abnormally high.

2) ***Math Inventory Results:*** ES students scoring "Below Basic" (as well as many elementary students scoring "Basic") on Math Inventory (MI)[2] again fell short on a full year's growth last school year. These results worsened their cumulative learning deficit, widening the achievement gap. As of the end of the prior school year, 1,058 students in Grades 2-5 were at a "Below Basic" level; all of them in need of Tier 3[3] interventions. ***See Appendix D.***

C. How Interventionists Improve APS

1) ***What Interventionists Do:*** Mathematics *interventionists* provide research-based interventions directly to students needing Tier 2 or 3 instruction in small groups or one-on-one sessions, with interventions tailored to those individual students' needs. In addition, interventionists support classroom teachers with monitoring and analyzing student data and with developing daily and long-range plans for students.

2) ***At Which APS ESs are Interventionists Currently Staffed:*** County-wide, we only have seven interventionists to split between them at the ES level. These interventionists are staffed at all Title 1 schools, except Campbell.

3) ***Academic Results at APS ESs with vs. without Interventionists:*** The graph in ***Appendix E*** sets forth the comparison of mathematics growth as determined by MI at APS ES with and without centrally-supervised interventionists.[4]

4) ***Improve Broader Math Ecosystem:*** Interventionists are not just important to the students to whom they are providing the Tier 2 and 3 interventions, but the broader math ecosystem in general. Without interventionists, this instruction is provided by teachers, math coaches[5], or classroom aides, depending on availability, removing them from their daily job. With an ever-widening gap between proficient and struggling students in certain ESs, it is becoming increasingly difficult for classroom teachers to accommodate the learning needs of all students while devoting sufficient time within their classrooms for Tier 1 instruction.

5) ***Improve Teacher Recruitment and Retention:*** As noted by School Board Member David Priddy, the help that interventionists provide classroom teachers not only in meeting the learning needs of all students, but also in increasing their ability to focus on Tier 1 instruction leads to improved teacher recruitment and retention. Prospective math hires have expressed appreciation for the depth of instructional support available from APS (i.e., school-based math coaches and, at certain schools, math interventionists).

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[2] The State of Virginia administers Standards of Learning (SOL) tests at the end of each year to measure student proficiency. MI is a classroom-based, universal screener and monitoring tool used in Grades 2-5, which we stopped usING at the end of last school year. We are using MI scores in this recommendation for two reasons: (A) the NWEA/MAP assessment is new to APS, and APS has not yet had the opportunity to determine an accurate percentile that differentiates a Tier 2 and Tier 3 need; and (B) the EOY MI assessment gives APS a more accurate indication of success schools were able to have with students in the absence of these interventionists.

[3] Tier 2 instruction provides students with tailored instruction in a small group setting within a math block, and Tier 3 instruction provides both tailored and research-based small group instruction ***in addition*** to instruction received within a math block.

[4] Some ESs without centrally-supervised interventionists did staff interventionists via their school budgets. Notably, the results in MI growth for the one school (Arlington Traditional School) with its own interventionist almost the entire school year looked very similar to the results of schools with centrally-supervised interventionists.

[5] Math *Coaches* strengthen core instruction by being a resource for teachers on the latest research-based instructional practices. They can additionally provide in-classroom assistance to teachers to the extent needed.

D. <u>Budgetary Implications of Request</u>

1) ***Cost of Request:*** Each interventionist is estimated to receive a salary and benefits in amount equal to $105,000. Thus, the estimated total cost of this budget request is $2,677,500.

2) ***Expiration of ESSER Funds:*** Arlington previously received funding for 4.5 Mathematics Interventionists for ESs through SY2023-24 as part of the ESSER-III Grant. While welcome, this staffing has paled in comparison to the current need and expires at the end of this school year.

	ESSER ES Interventionists	APS ES Interventionists	Requested ES Interventionists
2022-23	4.5	0	---
2023-24	7	0	---
2024-25			15

3) ***Smaller Request than Prior Year:*** Last school year, MAC recommended 34 Mathematics Interventionists (differentiated levels were not included in last year's request; however, approx. 29 of those positions would have been ES while approx. 5 were for the Middle School) to remediate learning loss and improve long-standing equity gaps.

   We stand by this request because evidence shows that these positions are still needed. In fact, principals are using funds from their respective budget to hire Math interventionists. Thus, we think this prior recommendation is applicable for the next school year as well. However, our directions are to provide a recommendation for the bare minimum number of interventionists. Considering how far behind academically so many ES kids are in math, we strongly feel that 15 ES interventionists is the bare minimum.

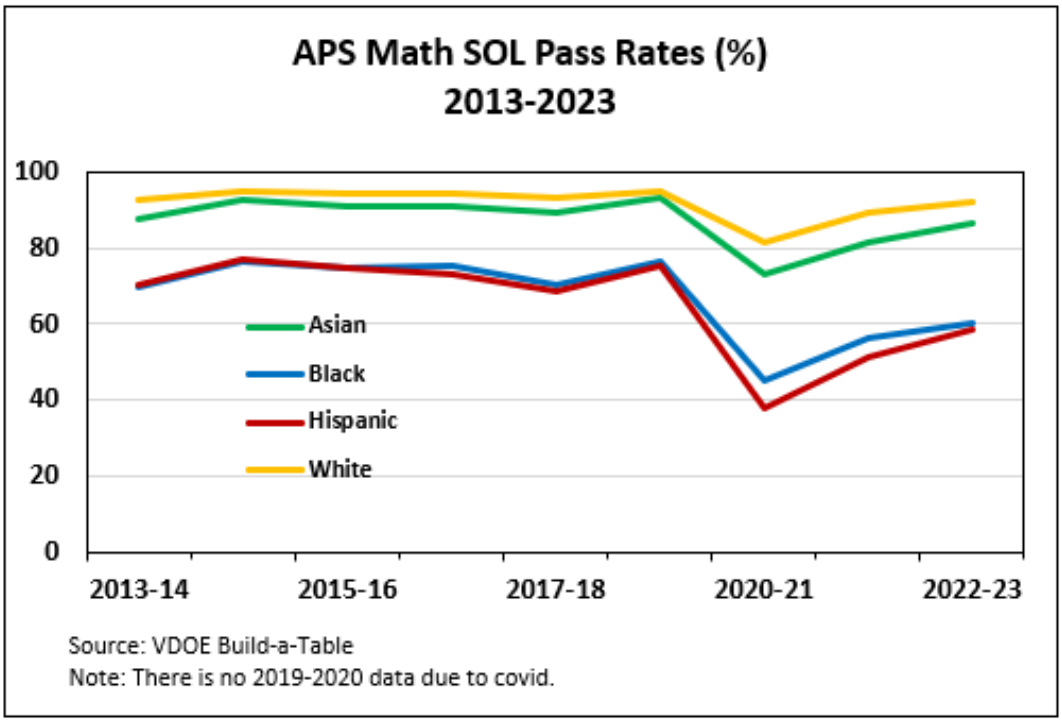
E. <u>At Which APS ESs Should Interventionists Be Staffed for the Next School Year</u>

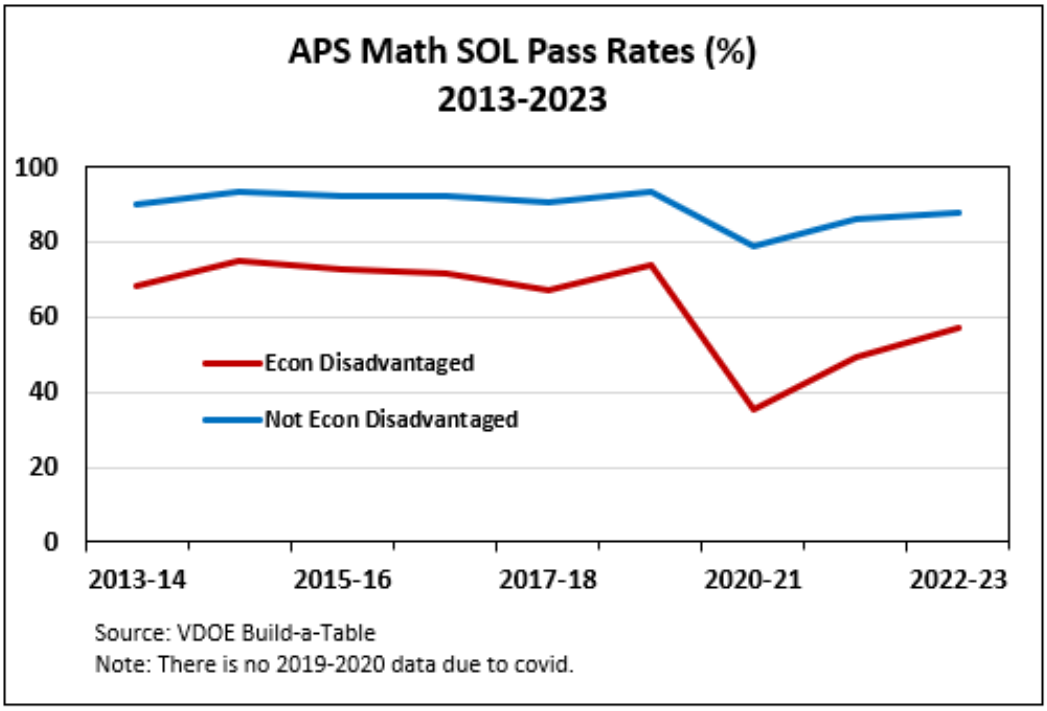
Because of the significant difference at the APS school level in the number of ES kids at the "Below Basic" MI level, we recommend the interventionists be staffed at certain schools based on academic need for the 2024-25 school year. ***See Appendix D.***

APPENDIX B

Arlington COVID Learning Loss and

Long-Standing Equity Gaps in Math SOLs

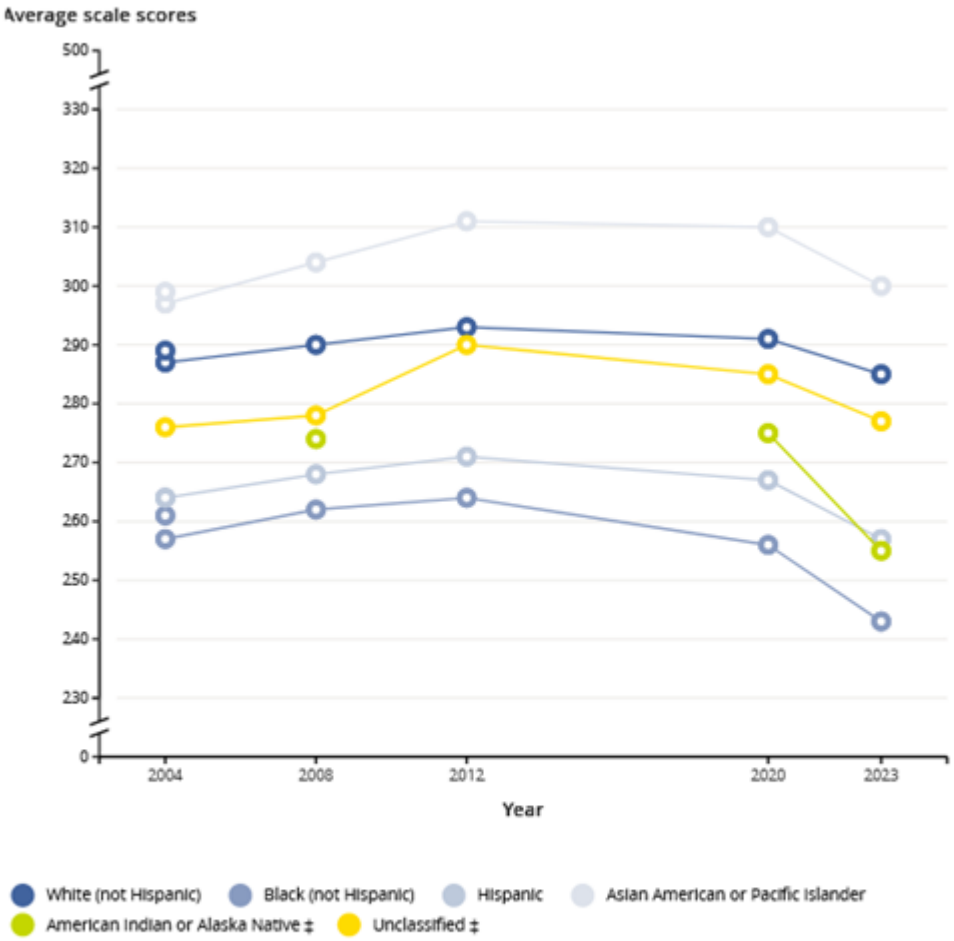




APPENDIX C

National NAEP Math Scores Showing COVID Learning Loss and Long-Standing Equity Gaps

Average scale scores for age 13 long-term trend mathematics, by Race/ethnicity (6 categories) [RACE] for jurisdiction: 2023, 2020, 2012, 2008, and 2004
National



‡ Reporting standards not met.
[1] Original assessment format.
NOTE: Black includes African American, Hispanic includes Latino, and Pacific Islander includes Native Hawaiian. Race categories exclude Hispanic origin. The NAEP Long-Term Trend Mathematics scale ranges from 0 to 500. Some apparent differences between estimates may not be statistically significant.
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2004, 2008, 2012, 2020, and 2023 Long-Term Trend Mathematics Assessments.

APPENDIX D

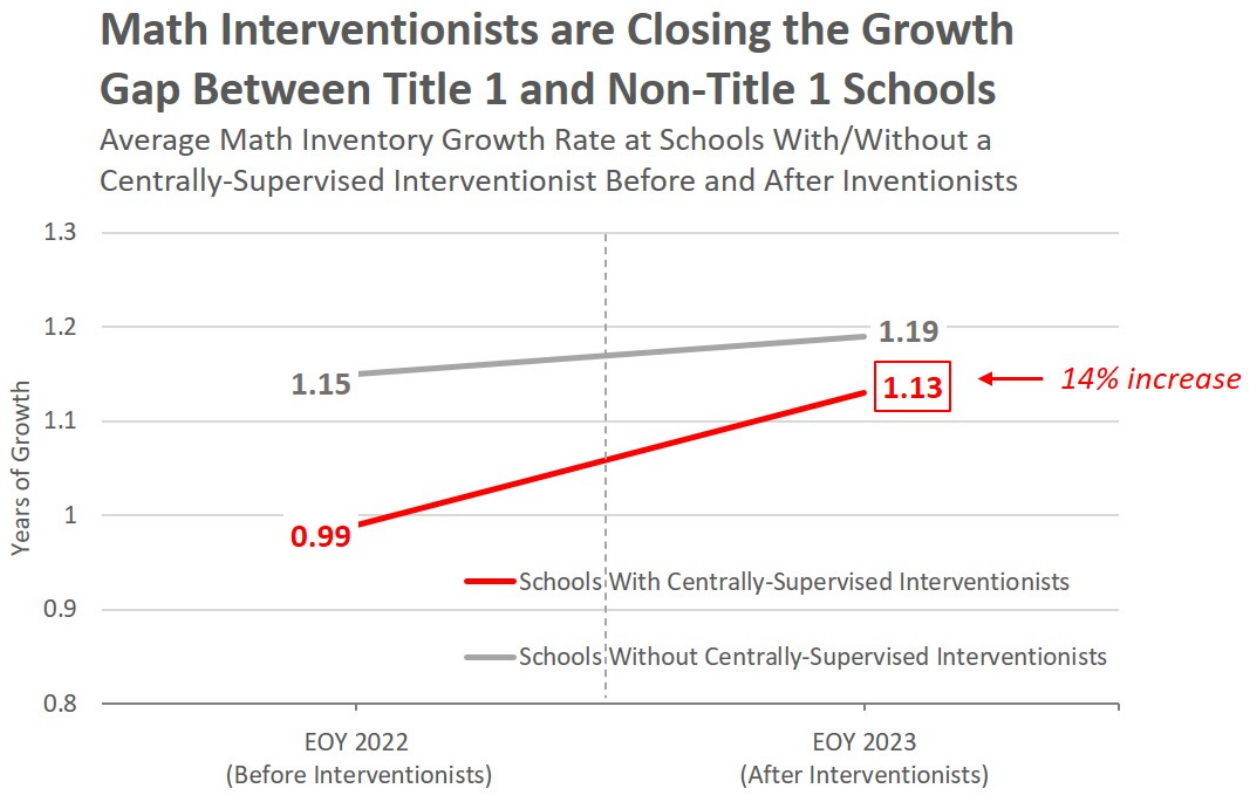
APS Students Below Basic at End of Year in Math Inventory for Grades 2-5 for 2022-23 School Year

Elementary School	Total Students Scoring Below Basic
Carlin Springs*	119
Abingdon*	95
Barrett*	89
Dr. Charles R. Drew*	84
Hoffman-Boston*	81
Oakridge	69
Barcroft*	65
Randolph*	64
Alice West Fleet	60
Escuela Key	44
Claremont	42
Long Branch	38
Innovation	33
Campbell*	32
Ashlawn	26
Arlington Science Focus	23
Montessori School of Arlington	20
Taylor	18
Cardinal	13
Tuckahoe	12
Discovery	11
Glebe	7
Nottingham	6
Jamestown	4
Arlington Traditional	3

*Title 1 schools; all Title 1 schools had a centrally-supervised interventionist except Campbell

APPENDIX E

Academic Results of Grades 2-5 Students at APS Elementary Schools with vs. without Interventionists



Source: APS

Please note that:

- Centrally-supervised interventionists started in the 2022-23SY – there were no centrally-supervised interventionists in the 2021-22SY
- These interventionists were staffed at all Title 1 schools except Campbell
- The amount of math growth shown by the students at the Title 1 schools with interventionists during the 2022-23SY was unprecedented during the tenure of the faculty advisers Shannan Ellis and Carl Seward (i.e., ***the growth rate of these Title 1 ESs almost reached parity with the other ESs***)
- Centrally-supervised math interventionists provide interventions to students at schools, but report directly to the Math department at Syphax