ESSER MS Math & Literacy Strategies:
Algebra I in Eighth Grade- End of Year Report
Prepared by the Department of Research & Performance Management

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Key Findings

- The teacher training allowed six additional middle school teachers to add an Algebra I endorsement onto their license.
- 59% of students who passed the placement test and eligibility requirement ultimately enrolled in Algebra I.
- More eighth-grade students took the Algebra I EOC exam this year and a larger proportion of those students were proficient.
- Students who were enrolled, but not deemed eligible by Assessment and Accountability and students who took the course at a partner high school did not perform as well as their eligible peers who took the course at their middle school.

Algebra I in Eighth Grade

Taking Algebra I in eighth grade is an essential component of preparing students for the academic rigors of pursing STEM degrees in college (Adleman, 2006). In fact, "early access to Algebra has an effect beyond simple increased knowledge measures and, in fact, may "socialize" a student into taking more mathematics, regulating access both to advanced coursework and increased achievement in high school" (Smith, 1996). Without enrolling in Algebra I during middle school, students are unlikely to have the opportunity to take Calculus during high school (US DOE, 2018). While the research supports early access for Algebra I, only 59% of middle schools across the nation offer the course (CRCD, 2016) and only 24% of eighth graders enroll in Algebra I (USDOE, 2018).

ESSER Algebra I in Eighth Grade Program Overview

To provide the foundation for students to take higher level math and science courses in high school, Memphis-Shelby County Schools used Elementary and Secondary School Emergency Relief (ESSER) funds to support access to Algebra I in eighth grade. Both policy and program changes were made to support the goal of not only providing greater access, but also increasing enrollment in Algebra I. A portion of ESSER funding was allocated to pay teacher stipends for participating middle school math teachers to receive a week-long training and take the Praxis exam to receive an endorsement to teach Algebra I. This would allow more schools to offer Algebra I to their middle schoolers. Then, MSCS changed their policy on Algebra I enrollment from voluntary enrollment to automatic enrollment with the option to opt-out for those students who qualify. This change ensured that all eighth graders who met the eligibility criteria were enrolled in the course, unless their parents opted to enroll them in a lower math course.

Key Performance Indicators

Three Key Performance Indicators (KPIs) were selected to measure the effectiveness of the program and the return on investment.

KPI Number	Key Performance Indicator
	70% of eligible students are enrolled in Algebra I in eighth grade.
	Increase the number of middle school teachers eligible to teach Algebra I.
	40% of enrolled eighth graders achieve "met expectations" or higher on the EOC exam.

Teacher Training

Eligible teachers were able to enroll in a two-week-long training program in June 2022. Seventeen teachers opted to participate and represented 14 schools.[1] Of those, 12 teachers (71%) were eligible to receive a stipend for completing all required aspects of the training. 10 teachers (59%) were eligible to receive reimbursement for taking the Praxis exam. Six (6) teachers (35%) who participated in training ultimately passed the Praxis exam. For the 2022–23 school year, there were 26 middle grades teachers who held an active endorsement to teacher Algebra I up from 19 in 2021–22.

Student Eligibility and Enrollment

Eligibility

In the summer of 2021, the Assessment and Accountability Office created a new criteria standard to determine who was eligible to enroll in Algebra I during their eighth-grade year. The average of the student's final numeric grade in seventh-grade math and the percent correct on their Algebra I placement test was used to create a performance score. Those who had a 70 average performance score or higher were eligible to enroll in Algebra I in eighth grade. Overall, 602 rising eighth graders[2] were considered eligible to enroll in Algebra I.

Eligible students primarily were enrolled in Pre-Algebra Honors in seventh grade (62%) followed by traditional seventh grade math (Math 07; 22%). Fourteen percent (14%) of students had an eligibility score of 90% or higher, 24% were in the 80–89.5% category, and most students scored in the 70–70.5% category (62%).

Eligibility Counts by Prior Course and Eligibility Score			
7th Grade Course	70–79.5%	80–89.5%	90% or higher
Math 07	73	34	23
Math 07 (Enriched)	59	9	1
Online (OL) Pre-Algebra 07	2	3	—
Pre-Algebra 07	23	3	—
Pre-Algebra 07 Honors	215	94	63

[1] A teacher from one middle school ultimately declined the teaching role, so only 13 schools ended up with teachers participating in the training.
[2] Rising 8th graders were not guaranteed to re-enroll with the District, so this value is valid only for those students who completed 7th grade at a District-managed school.

Enrollment

While 602 seventh grade students were eligible to take Algebra I, based on the 70% and above eligibility criteria, only 549 of those reenrolled in a MSCS District-managed school for the 2022–23 school year. Of those 549 students who reenrolled, 323 enrolled in Algebra I in eighth grade (58.8%). In total, there were 435 students enrolled in Algebra I in eighth grade in 2022–23 school year, regardless of their eligibility status.

It is important to note that 97 eighth-grade students enrolled in Algebra I despite not meeting the outlined eligibility requirements of having a combined score of 70 and above. Also, there were an additional 15 students who were not previously with MSCS, but still enrolled in Algebra I in eighth grade. In total, 112 students enrolled in Algebra I in eighth grade who were either not previously enrolled in MSCS or did not meet eligibility standards.

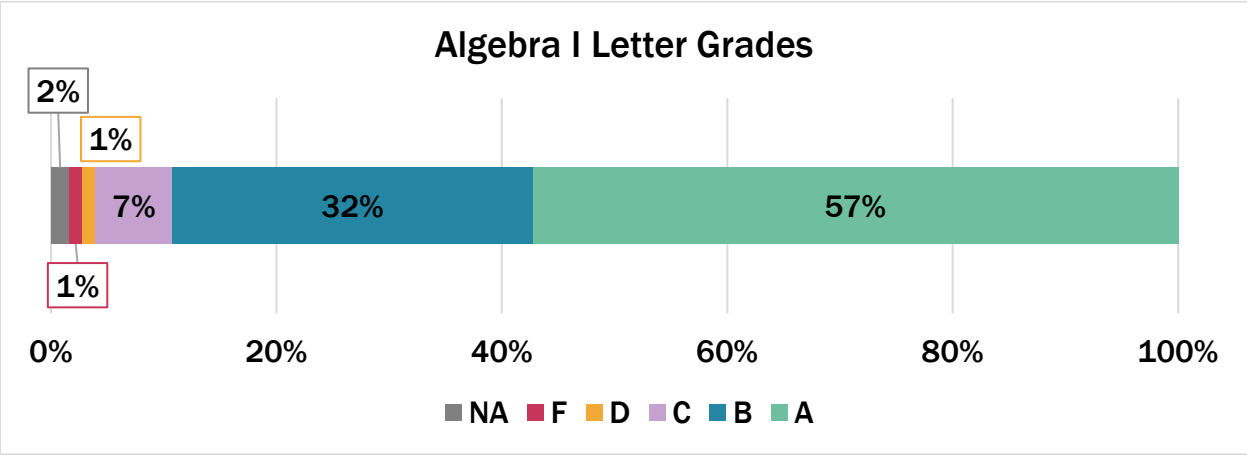
When looking at enrollment in relation to prior seventh-grade course history, eligible students in Pre-Algebra Honors 07 and Math 07 Enriched were more likely to ultimately enroll in Algebra I in eighth grade. Sixty-eight (68.1%) of eligible students who took Math 07 Enriched enrolled in Algebra I, 60.2% for those who took Pre-Algebra 07, whereas the enrollment rate for Math 07 and Pre-Algebra 07 was roughly half that (33.1% and 34.6% respectively). (See Appendix A for full breakdown.)

Not all middle schools were able to offer an Algebra I course at their school for a variety of reasons. Some schools may not have had a qualified teacher or only had a handful of students who qualified (3 or fewer). These schools allowed their students to enroll in an Algebra I course through a partner school, mostly a feeder high school. This option was utilized by 20 students. (See Appendix A for breakdown of location of courses and enrollment schools.)

Student Performance

Grades

Eighth graders taking Algebra I did well in their course. Eighty-nine percent (89%) earned an A or a B at the end of the year. Only 4% scored a D or lower (including those who did not receive a final grade) and only 5 students out of 435 failed the course. Importantly, students taking the Algebra I course at a partner high school did not fare as well in relation to their final grades. Eighty-five percent (85%) of students utilizing the partner option had a C or lower at the end of the year (See Appendix B for a breakdown of grades by course location.) One reason for this discrepancy in grades may stem from the issue that students who enroll in Algebra I in 8th grade often miss some 8th grade specific content due to curriculum progression. Middle school Algebra I teachers are aware of this gap and typically will cover those areas during the Algebra I course, so that students do not miss out. However, high school instructors primarily teach ninth graders who did not have this gap and are thus less likely to cover the skipped content.



EOC Results

In 2022–23, 404 eighth graders took the Algebra I EOC exam[3]. Over half of the eighth graders who took Algebra I (55.2%) scored proficient in Algebra I. This represents a 14.4 percentage point increase over the proportion of eighth-grade students who were proficient the prior year in Algebra I (39.8%). Additionally, for the students who were not proficient, 17% scored in the "Below" category, down from 37% the prior year. (See Appendix B for the full breakdown of proficiency levels by year.)

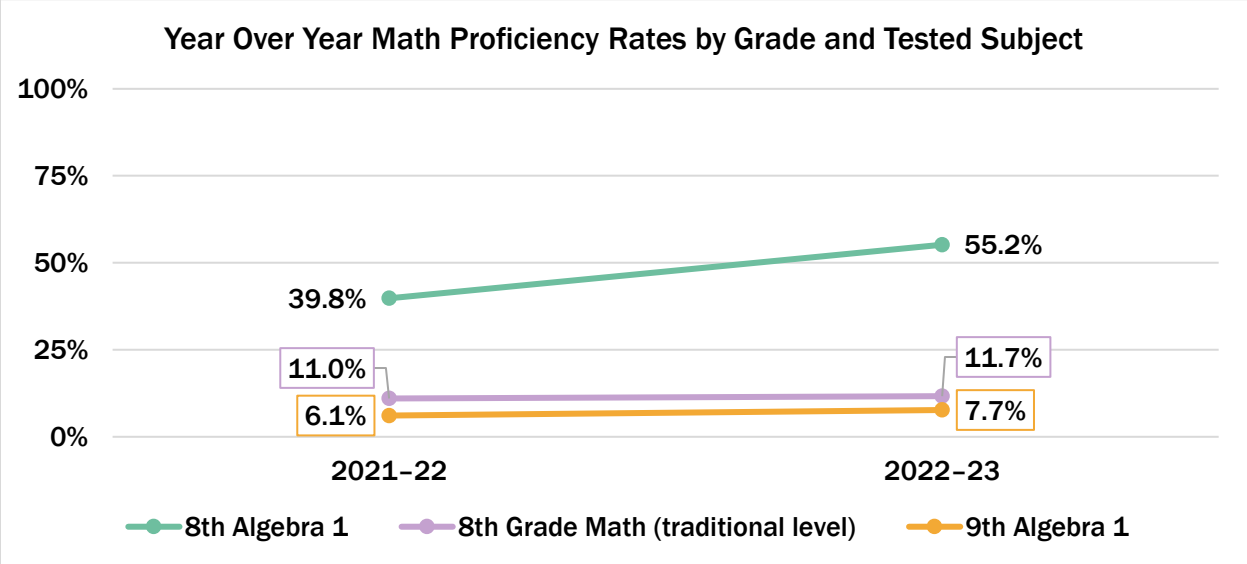
Students who completed Enriched Math 07 and Honors Pre-Algebra had the highest proficiency rates of all student background categories (60% and 71%, respectively). Those who were not MSCS students or were not flagged as eligible at the end of seventh grade had the lowest proficiency rate (25%) indicating that the inclusion criteria set by the Department of Assessment & Accountability was a valid indicator of future TCAP proficiency. Schools should use caution when placing students into Algebra I in eighth grade if the Assessment and Accountability Office did not indicate they were eligible based on the internal MSCS metrics.

Percentage of Eighth-grade Students Scoring in Each TCAP EOC Category for Algebra I

Math Course[4]	*n*	Below	Approaching	Met Expectations	Exceeded Expectations
Math 07	40	40%	28%	30%	3%
Enriched Math 07	45	13%	27%	38%	22%
Online Pre-Algebra	0	—	—	—	—
Pre-Algebra	9	33%	22%	44%	0%
Honors Pre-Algebra	219	8%	21%	35%	36%
Other	89	28%	47%	19%	6%

[3] Only students who received a proficiency level, who tested with MSCS, and who were enrolled with the District 50%+ of the year are included in the data.
[4] Two students took the Algebra I EOC exam who were not enrolled in Algebra I during the school year. They are excluded from the chart.

Since students who take Algebra I in eighth grade are more academically prepared than students on the traditional math track (Attewell & Domina, 2008), their performance on the Algebra I EOC is predicted to be higher than ninth graders who enroll in the same course. This was true for the 2022–23 year as well. Only 7.7% of ninth graders were proficient in Algebra I, compared to 55.2% of eighth graders. To put this in perspective, 81 out of 5,664 ninth graders were in the highest performance category, yet even more eighth graders (*n* = 96) scored the same, though only 404 took the exam. The trend is the same when comparing eighth graders who took Algebra I and those on the traditional math track. Twelve percent (11.7%) of traditional-math-track eighth graders were proficient, representing a 43.5 percentage point disparity (see Appendix B for the full breakdown).



Conclusion

Overall, the policy and program changes were successful in promoting higher enrollment in Algebra I for students. Eligible students in honors or enriched math classes in seventh grade were more likely to enroll in Algebra I and more likely to score proficient than students in traditional-level math courses. The eighth graders taking Algebra I scored better on the EOC this year than in prior years and better than ninth graders in Algebra I and eighth graders in traditional math courses. MSCS should continue to support preparing teachers to teach Algebra I in middle school and encourage students to enroll in this course in eighth grade.

Appendix A

Student Enrollment

Counts and Percentages for Algebra I Enrollment by 7th-Grade Course				
7th Grade Course	Count of Eligible Students	Count of Students who Enrolled in Algebra I	Percent of Eligible Students in 7th-Grade Course who Enrolled in Algebra I	Percent of All Students who Enrolled in Algebra I
Math 07	130	43	33%	10%
Math 07 (Enriched)	69	47	68%	11%
Online (OL) Pre-Algebra 07	5	—	—	—
Pre-Algebra 07	26	9	35%	2%
Pre-Algebra 07 Honors	372	224	60%	51%
Not a prior MSCS student or no placement tests	—	112	—	26%

Counts of Students Enrolled in Algebra I by Middle School	
School Enrollment/Course Location	Count of Students Taking Algebra I
A. Maceo Walker Middle	0
Airways Achievement Academy MS [taken at Trezevant HS]	1
American Way Middle	12
American Way Middle [taken at Overton HS]	1
Barrets Chapel School	9
Bellevue Middle	8
Chickasaw Middle [taken at Westwood HS]	1
Colonial Middle	19
Cordova Middle	0
Craigmont Middle [taken at Craigmont HS]	1
Cummings School	0
Dexter School	12
Dexter School [taken at Bolton HS]	1
Douglass School	1
Douglass School [taken at Douglas HS]	2
E.E. Jeter School	6
E.E. Jeter School [taken at Trezevant HS]	1
Geeter School	2
Geeter School [taken at Melrose HS]	1
Geeter School [taken at Sheffield HS]	1
Georgian Hills Middle [taken at Trezevant HS]	1
Germantown Middle	15
Gordon Achievement Academy	0
Grandview Heights Middle School	0
Hamilton School	0

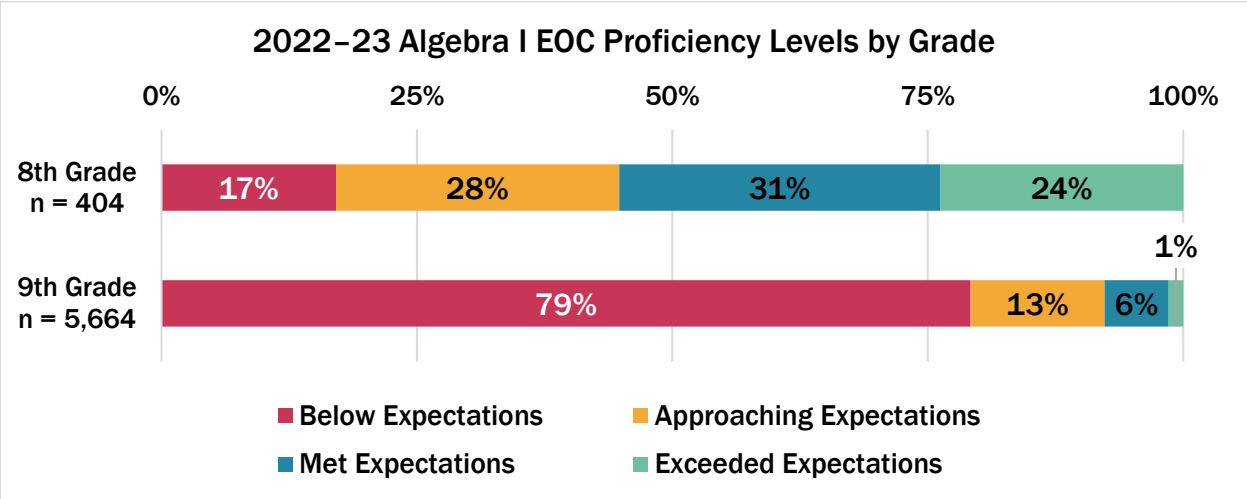
Counts of Students Enrolled in Algebra I by Middle School	
School Enrollment/Course Location	Count of Students Taking Algebra I
Havenview Middle	0
Hickory Ridge Middle [taken at Ridgeway HS]	1
Highland Oaks Middle	26
Highland Oaks Middle [taken at Southwind HS]	2
Hope Academy	1
Ida B. Wells Academy [taken at B.T. Washington HS]	1
J. P. Freeman School	26
Kate Bond Middle School	28
Kingsbury Middle	0
Lowrance School	24
Maxine Smith STEAM Academy	67
Mt. Pisgah Middle/High	12
Oakhaven Middle	12
Raleigh-Egypt Middle	3
Ridgeway Middle [taken at Ridgeway HS]	1
Riverview School	0
Sherwood Middle [taken at Overton HS]	1
Snowden School	25
Treadwell Middle School	9
Treadwell Middle School [taken at Kingsbury HS]	2
University Middle School	30
White Station Middle	67
White Station Middle [taken at White Station HS]	1
Woodstock Middle School [taken at Trezevant HS]	1

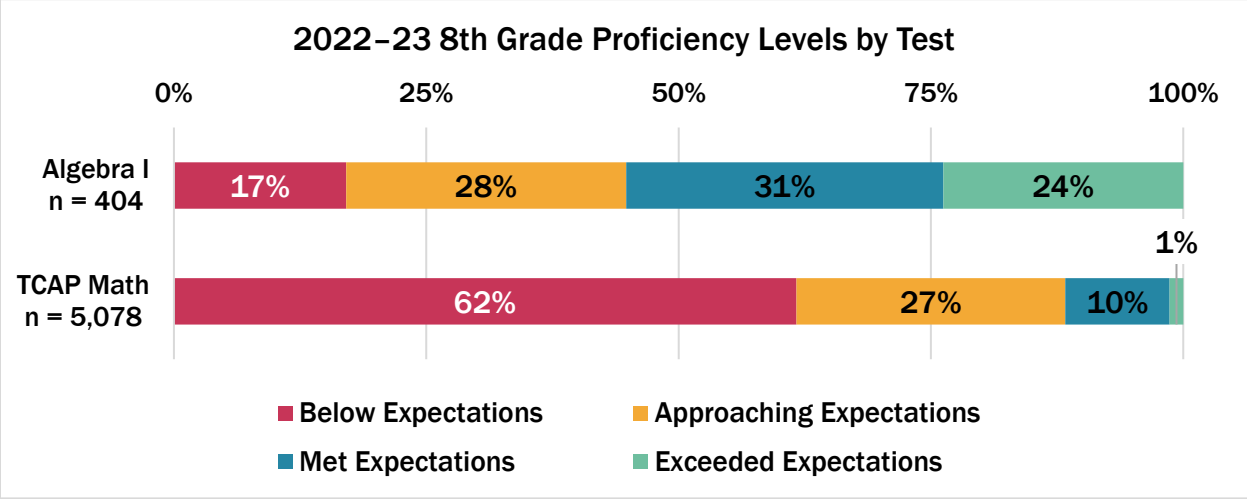
APPENDIX B

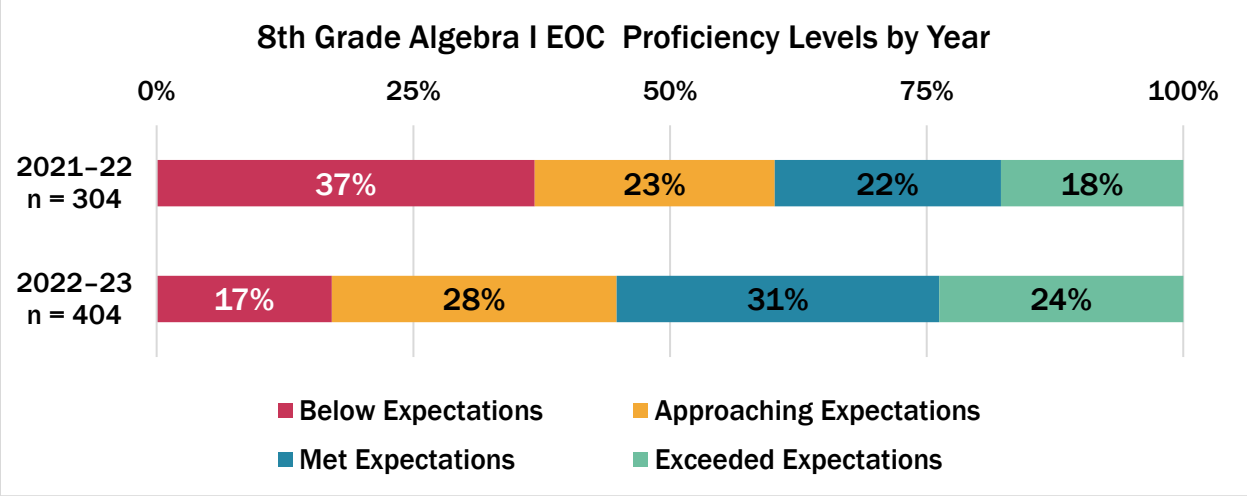
Student Performance

Algebra I Grades by Course Location		
	Algebra I Taken at MS	Algebra I Taken at HS
A	249	0
B	136	< 5
C	21	9
D	< 5	< 5
F	< 5	< 5
NA	7	0

Year over Year TN Ready and EOC Math Levels for 8th and 9th Graders by Subject						
	2021-2022			2022-23		
	8th Algebra I	8th Grade Math (traditional level)	9th Algebra I	8th Algebra I	8th Grade Math (traditional level)	9th Algebra I
Performance Levels						
Below Expectations	112	3,259	4,270	69	3,132	4,485
Approaching Expectations	71	1,330	601	112	1,353	743
Met Expectations	67	491	247	127	525	355
Exceeded Expectations	54	77	70	96	68	81
Proficiency Levels						
Proficient	39.8%	11.0%	6.1%	55.2%	11.7%	7.7%
Non-proficient	60.2%	89.0%	93.9%	44.8%	88.3%	92.3%


2022–23 Algebra I EOC Proficiency Levels by Grade
0%
25%
50%
75%
100%
8th Grade
n = 404
17%
28%
31%
24%
9th Grade
n = 5,664
79%
13%
6%
1%
Below Expectations
Approaching Expectations
Met Expectations
Exceeded Expectations


2022–23 8th Grade Proficiency Levels by Test
0%
25%
50%
75%
100%
Algebra I
n = 404
17%
28%
31%
24%
TCAP Math
n = 5,078
62%
27%
10%
1%
Below Expectations
Approaching Expectations
Met Expectations
Exceeded Expectations


8th Grade Algebra I EOC Proficiency Levels by Year
0%
25%
50%
75%
100%
2021–22
n = 304
37%
23%
22%
18%
2022–23
n = 404
17%
28%
31%
24%
Below Expectations
Approaching Expectations
Met Expectations
Exceeded Expectations

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