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AFTER COVID: CHANGES in MISSOURI MAP and NAEP SCORES 2018 - 2023

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2 MAP Scores and Trends

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What is MAP?

Each year, the state of Missouri uses Missouri Assessment Program (MAP) testing to gather data related to student achievement according to the Missouri Learning Standards at the student, class, school, district, and state levels. Missouri adopted MAP in 1993 in response to the Outstanding Schools Act, which required statewide assessment systems. MAP has continued to evolve both as part of the state's accountability system and alongside efforts to monitor performance nationally at the school level. Since the enactment of No Child Left Behind in 2001, students in Grades 3–8 are assessed each April–May in Mathematics and English Language Arts (ELA). Students in Grades 5 and 8 are also tested in Science. Since 2015, MAP testing has been administered online.[1]

All students in Grades 3–8 take three sessions of the ELA assessment, containing selected response and technology-enhanced items. Students in Grades 4 and 8 complete a fourth ELA session containing passage-based items and a writing prompt. All students in Grades 3–8 take three sessions of the Math assessments. The first two Math sessions contain selected response and technology-enhanced items, while the third is a performance event[2]. Selected-response items are those traditionally known as multiple-choice, where questions are followed by lists of possible answers, and students select the correct response(s). Technology-enhanced items utilize the virtual administration of the test in the presentation of test items or students' modes of responding to them (for example, using audio stories or a drag-and-drop feature). Performance events require students to investigate real-world scenarios.[3]

MAP Assessment Results

The MAP assessment results are given as a scale score. The minimum and maximum scores in the range increase with each grade and are comparable across grades within the same subject area. In Table 1 below, you can see the score ranges for each grade level. Students who score lower than the expected "guessing score" receive a predetermined Lowest Attainable Scale Score. Students who do not complete enough items for the test to assess their knowledge adequately or are absent for parts of the testing window are assigned a score of Level Not Determined (LND). Based on their scale score, students are assigned a Performance Level of Below Basic, Basic, Proficient, or Advanced to describe their performance regarding the assessed skills and content.[4] A description of the four performance levels for each grade and content area can be found here.

Table 1. Scale Score Ranges for MAP Testing by Grade Level

	ELA Scale Score Range	Math Scale Score Range
3rd Grade	160-560	185-520
4th Grade	170-570	210-540
5th Grade	210-600	250-570
6th Grade	230-620	260-580
7th Grade	240-630	270-600
8th Grade	250-650	310-660

Source: DESE Guide to Interpreting MAP Results

Overall, average scale scores in Mathematics took a more significant hit than ELA scores over the course of the pandemic, although in 2021, both subjects hit a low across all grades. In Math, Grade 3 scores decreased the most (an average of 11 scale score points), while Grade 7 scores decreased the least on average (2 scale score points). Since 2021, Math scores have continued to rise, and Grades 6 and 7 have bounced back to pre-pandemic levels. Grade 8 matched their 2019 score in 2022 but fell one point in 2023, which is likely negligible when taken together with the percentage of students scoring proficient or advanced (see Figure 2, below). Results also indicate that the percentage of students scoring proficient or advanced is rebounding since the 2021 low scores, with Grades 6–8 now completely "recovered."

Figure 1. Math MAP Scale Scores by Grade (3–8), 2018–2023

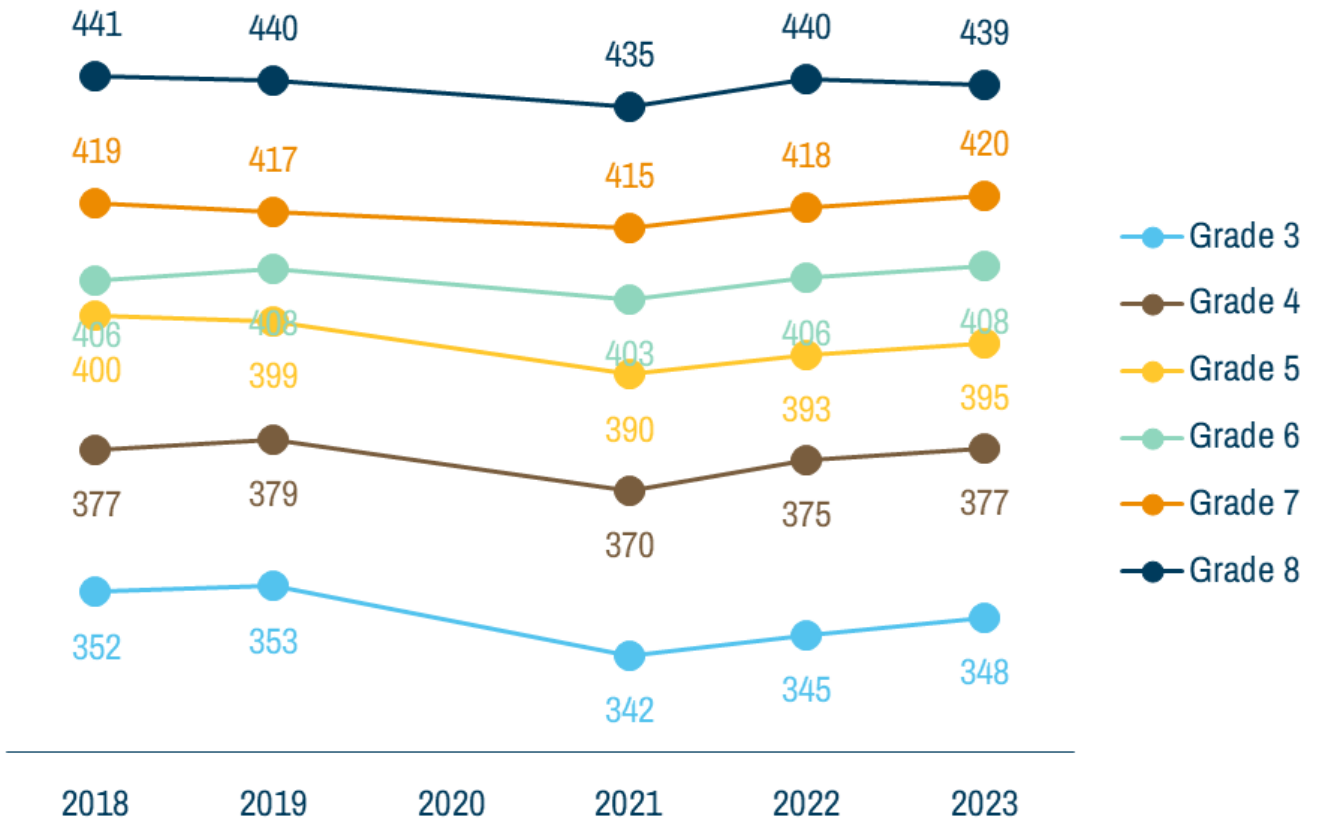
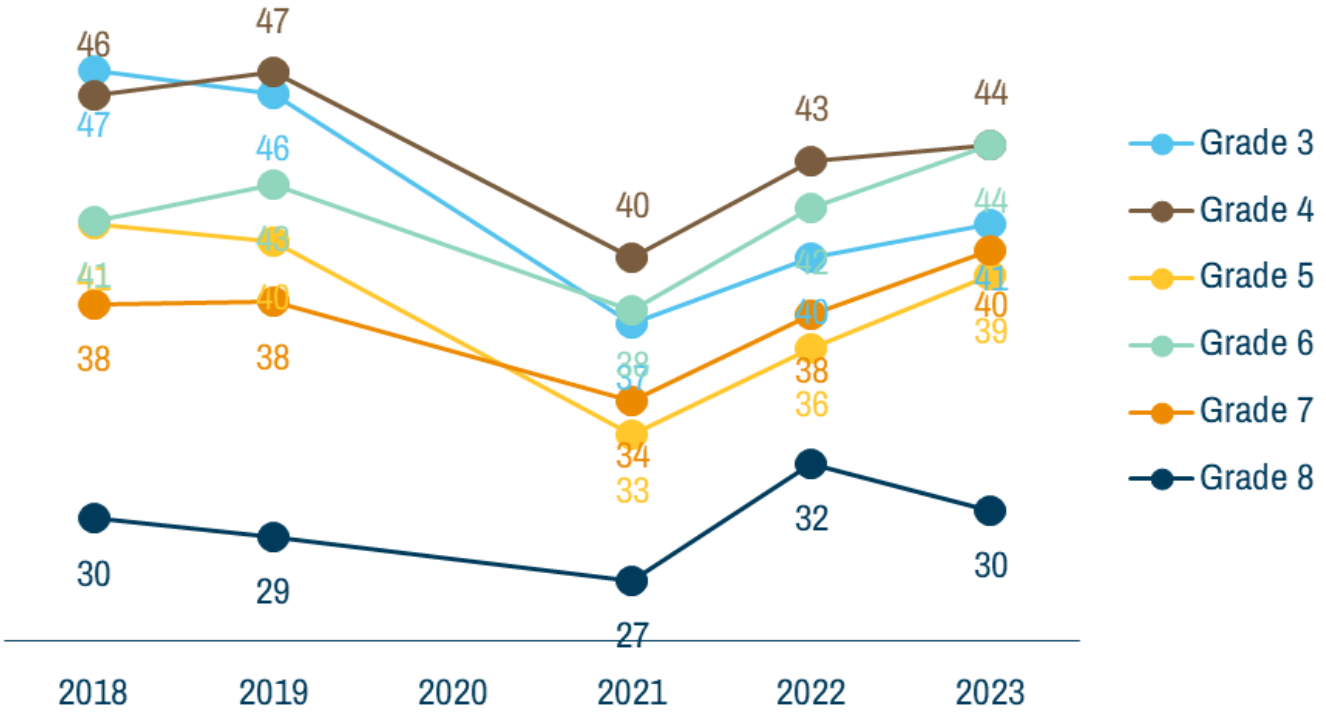


Figure 2. Math MAP Percentage of Students Scoring Proficient or Advanced



Note: The reported percent of students scoring proficient or advanced in 8th grade does NOT include those students who took the Algebra I EOC rather than the 8th Grade Math MAP test. The percentage of 8th Grade students scoring proficient or advanced on either test in 2023 is 40%.

During the pandemic, we saw less significant declines in ELA scores between 2019 and 2021. However, these scores have yet to rebound as the Math scores have. Grades 3–5 saw modest improvements last year, but middle grades continued to fall or remain steady. None of the average scale scores for any grades tested have returned to pre-pandemic levels. The smallest gap remains in Grade 4, where students scored only three scale score points behind the 2019 average, while the largest gap exists in Grade 6, where the student average is eight points behind the 2019 average.

Figure 3. ELA MAP Scale Scores by Grade (3–8), 2018–2023

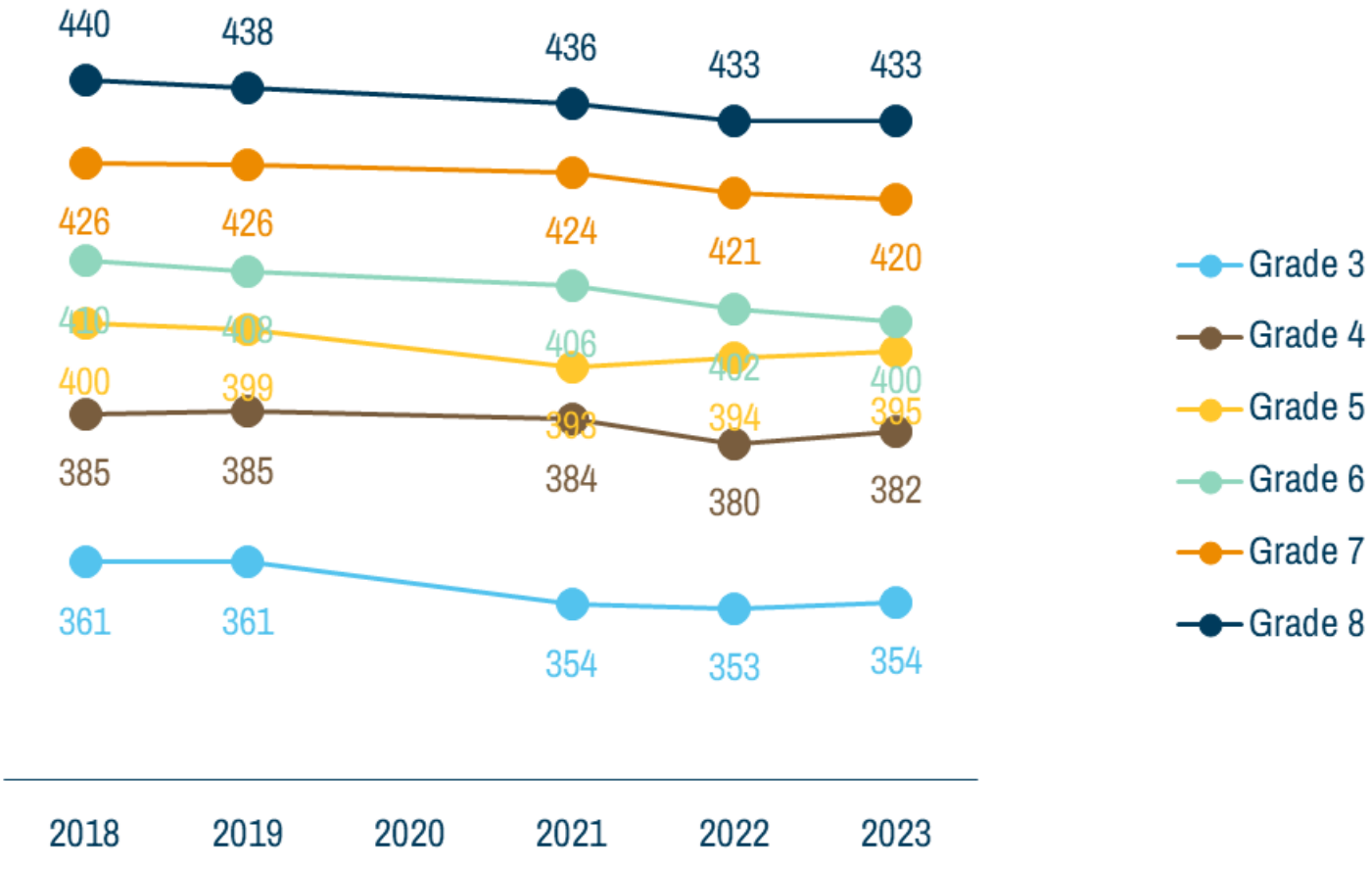
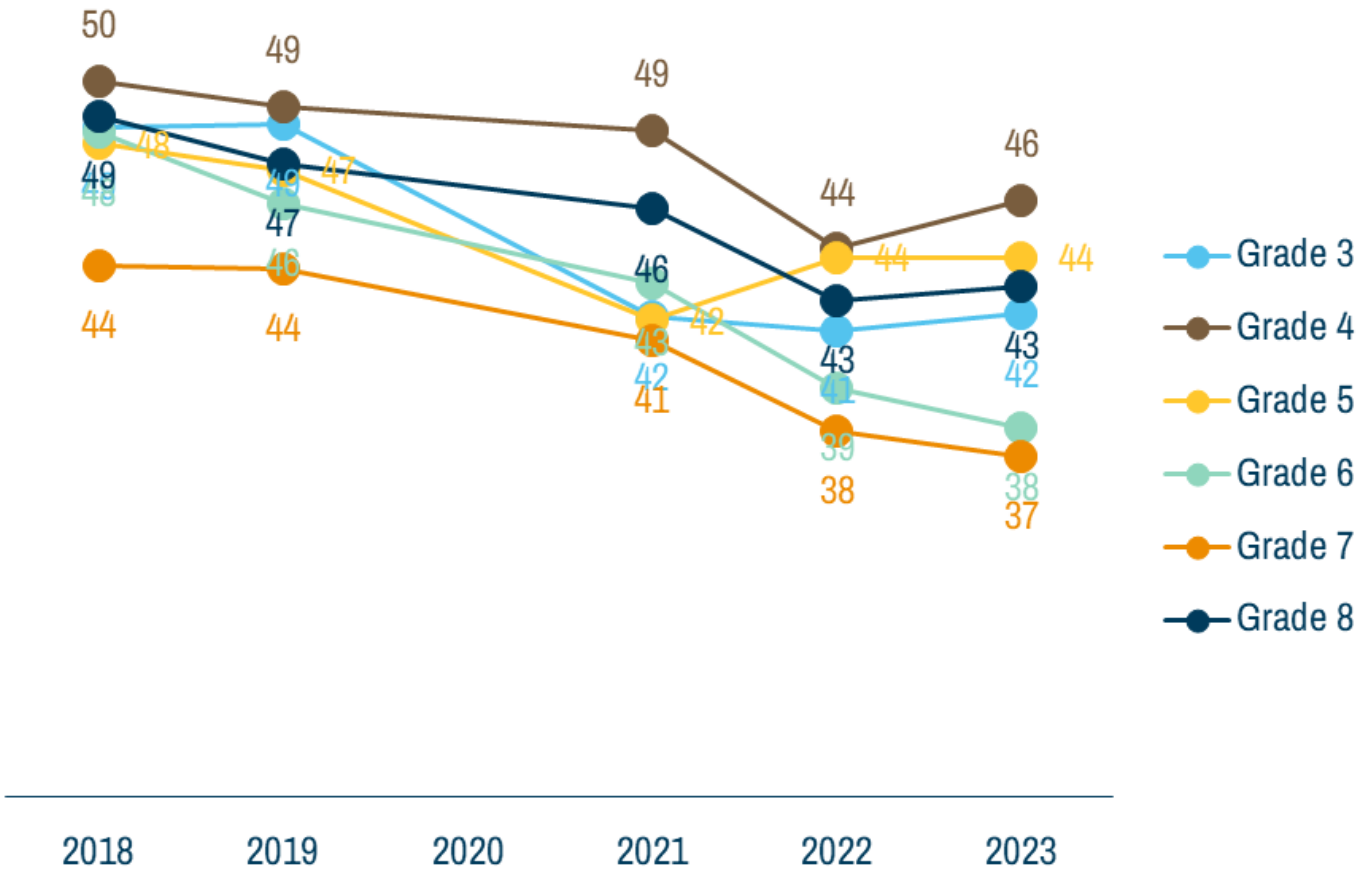


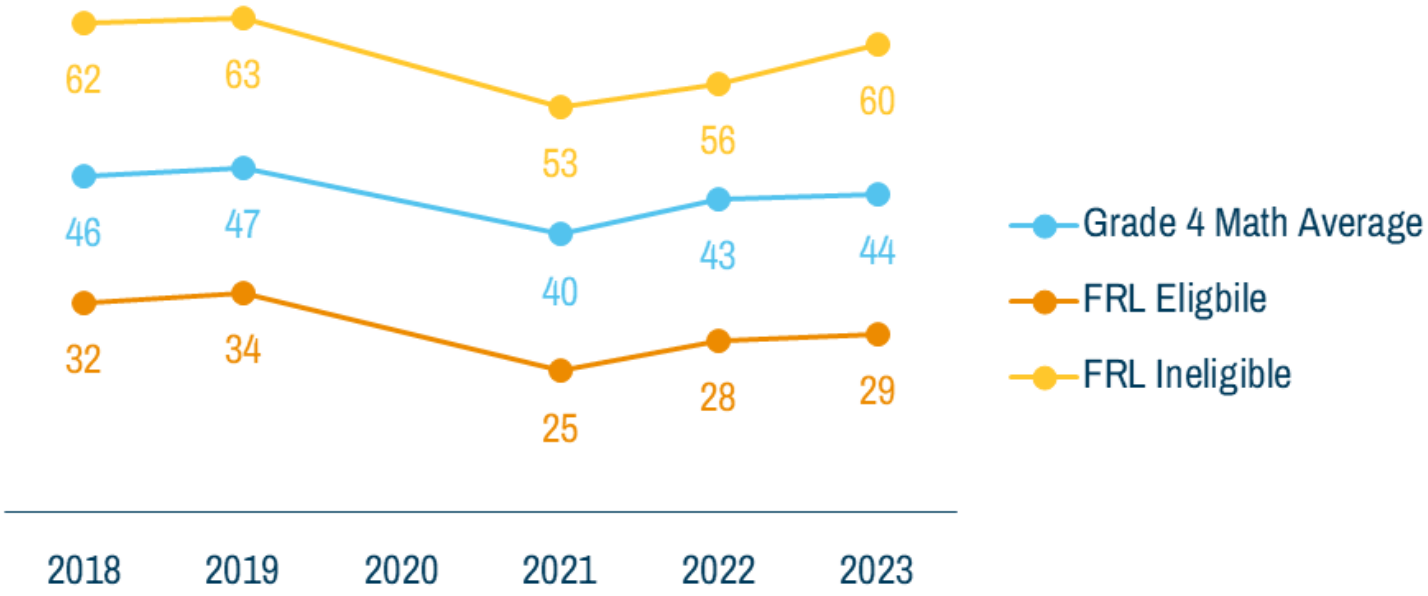
Figure 4. ELA MAP Percentage of Students Scoring Proficient or Advanced



MAP Trends by National School Lunch Program Eligibility

The National School Lunch Program (NSLP) provides discounted or free meals to students whose household income meets federal requirements.[5] This is sometimes also referred to as FRL for Free or Reduced Price Lunch. Eligibility for the program is a means to approximate students' socioeconomic status.

Figure 5. 4th Grade Math MAP Percentage of Students Scoring Proficient or Advanced by FRL Status



Overall, we see a persistent gap between the performance of students eligible for the NSLP and those who are not across all grades. We present selected grades' results here. In fourth grade, we see a gap of about 30 percentage points between the two groups, a number that was slightly exacerbated by the pandemic. In 2019, there were 29 percentage points between the scores of 4th Grade NSLP-eligible and NSLP-ineligible students in Math, while in 2023, there was a gap of 31 percentage points. In 4th Grade ELA, the gap grew from 29 percentage points in 2019 to 30 percentage points in 2023.

Figure 6. 4th Grade ELA MAP Percentage of Students Scoring Proficient or Advanced by FRL Status

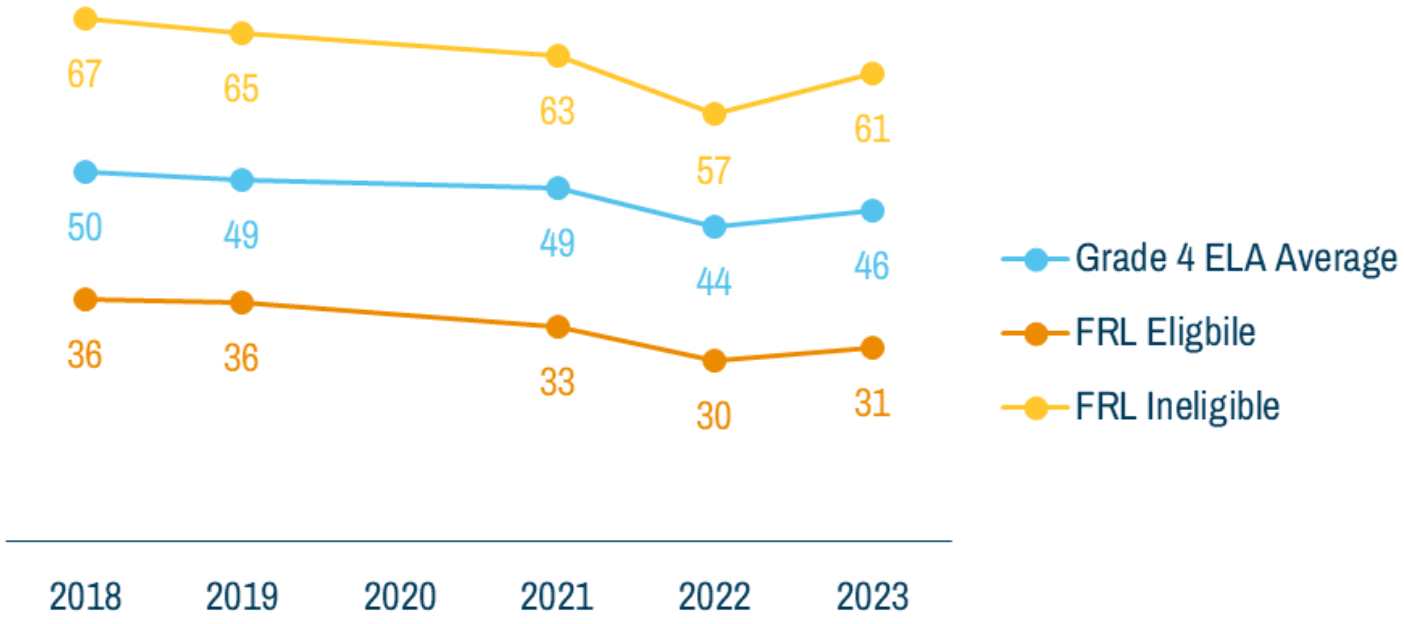
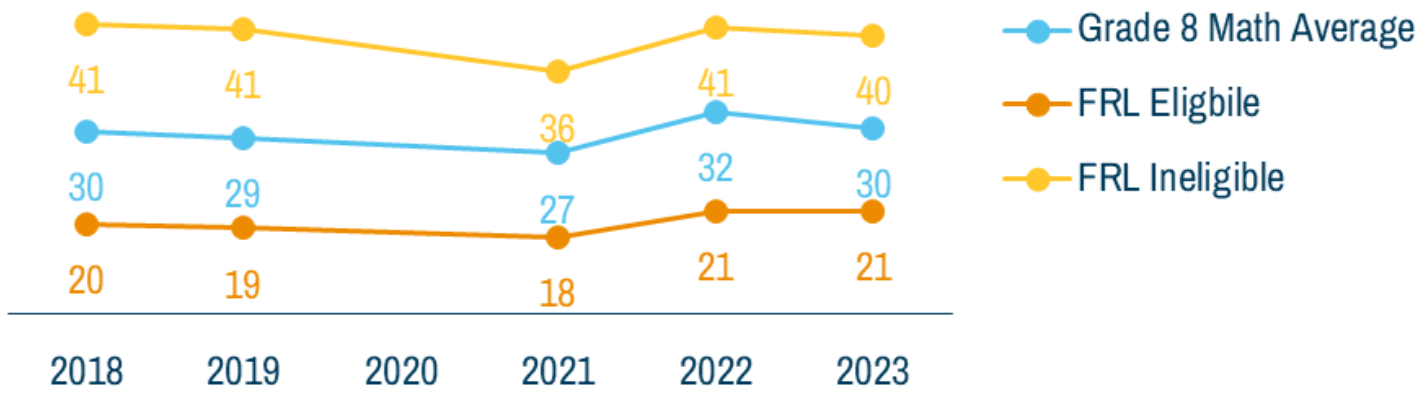


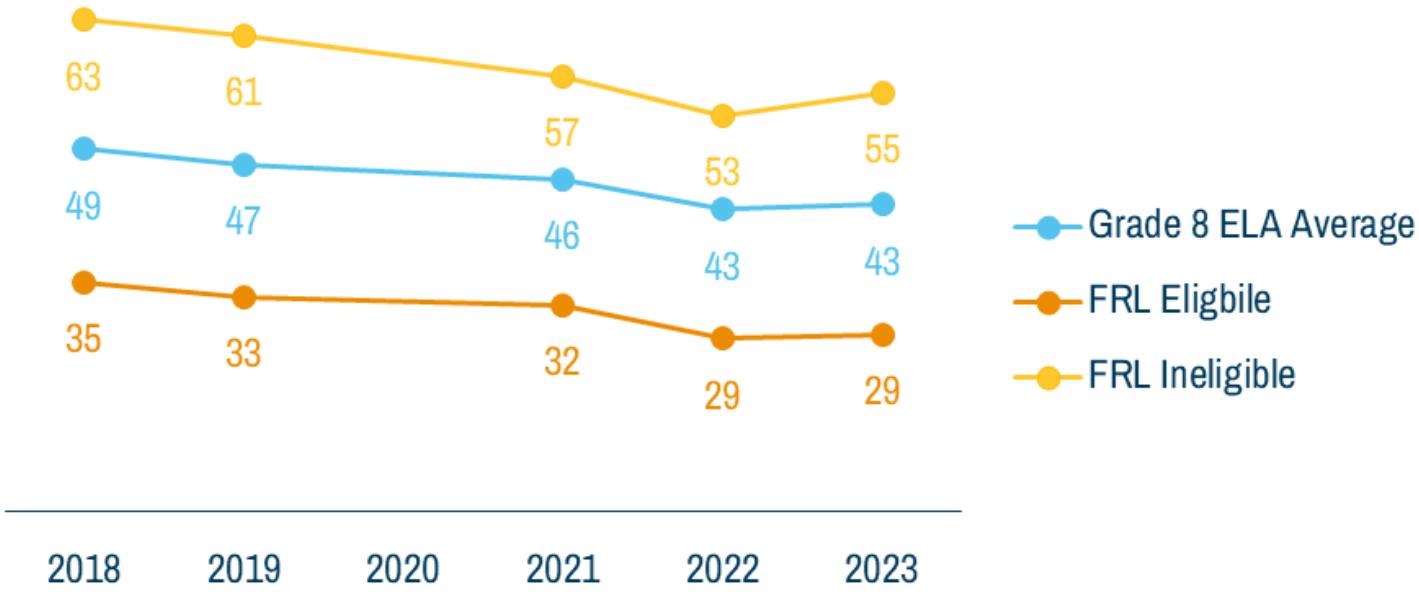
Figure 7. 8th Grade Math MAP Percentage of Students Scoring Proficient or Advanced by FRL Status



Note: The reported percent of students scoring proficient or advanced in 8th grade does NOT include those students who took the Algebra I EOC rather than the 8th Grade Math MAP test. The percentage of 8th Grade students scoring proficient or advanced on either test in 2023 is 40%.

In 8th Grade, we still see a large gap between the scores of NSLP-eligible and NSLP-ineligible students, but one that is slightly narrowing. However, these results must be looked at carefully since, as noted earlier, the 8th Grade percentages do NOT include those students who took the Algebra I EOC test rather than the 8th Grade Math MAP test. With the data we do have, we see a 22-percentage point gap in 2019's math scores, and a 19-point gap in 2023's. For ELA, the gap shrinks from 28 percentage points in 2019 to 26 in 2023.

Figure 8. 8th Grade ELA MAP Percentage of Students Scoring Proficient or Advanced by FRL Status



What is the NAEP?

The National Center for Education Statistics (NCES) is the primary statistics agency for the United States Department of Education. They collect, analyze, and report data on the state of U.S. Education. One way they collect data is by administering assessments. One such test is the National Assessment of Educational Progress (NAEP), which is collected in two ways: the Main NAEP and the Long-Term Trends (LTT) assessments. Both tests give us access to different aspects of the state of American education.[6] Below is a summary of the differences between the two assessments.

Table 2. Differences Between Main NAEP and LTT NAEP Assessments

	Main NAEP	LTT
Origin	1990s	1970s
Frequency	Every 2 Years	Every 4 Years
Content Assessed	Math and Reading; Other subjects (i.e. Science, Civics, U.S. History, and Writing) on a rotating schedule	Math and Reading (Different skill sets than Main NAEP)
Question Format	Variety of multiple choice, short answer, and extended answer	Mostly multiple choice with a few short answer and extended answer
Students Sampled	Nationally representative sample of 4th, 8th, and 12th grade students	Nationally representative sample of 9, 13, and 17-year-olds
Administration	Winter (January–March) for all grades	Fall (October–December) for 13-year-olds, Winter (January–March) for 9-year-olds, Spring (March–May) for 17-year-olds
Test Structure	Two 25-minute blocks of questions plus a student survey	Three 15-minute blocks of questions plus a student survey
Results Reported	National, State, and Some Districts using 0–300 or 0–500 scale scores and achievement levels (Basic, Proficient, Advanced)	National using 0–500 scale scores and performance levels (150, 200, 250, 300, and 350)

Source: NCES Main Differences Between LTT NAEP and Main NAEP

Ordinarily, NCES administers Main NAEP assessments every two years and LTT assessments every four years. Due to COVID, NCES altered the testing schedule, delaying the Main NAEP assessment by one year and pushing forward the LTT NAEP assessment by one year to gather data about the effects of COVID-19 on U.S. students. Moving forward, they will administer the Main NAEP in the winter of even years, with the results released the

following summer and winter. Therefore, the next testing window will be Winter[a] (January–March) 2024, with results released in the Winter and Summer of 2025. The LTT will occur every four years, starting with an administration in Winter 2025 and results released in Summer 2026. The Main and LTT NAEP tests assess Math and Reading every time, although the questions do not cover the same skills. Therefore, results are not directly comparable to one another, just to previous years' tests of the same type.[b] Although they also test students on their Math and ELA skills, the results are not directly comparable to those from national-level testing.

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[a] NCES uses physical seasons when reporting dates. For example, Winter 2024 means January – March of 2024 (the Spring semester of the 2023–2024 school year).

b NCES also reports the above statistics for the territory of Puerto Rico and the Department of Defense (DoDEA) school system for military-associated students. These figures have been excluded from the data set due to inherent differences in the school systems that cause scores to be very different than those of the fifty states and District of Columbia.

Main NAEP Results

The most recent Main NAEP assessment occurred in 2022 and was the first to be administered after COVID-19. Data is reported on the National and State levels for this assessment. When examining the data before and after the pandemic, we see declines across the board for 4th and 8th Grade Math and Reading scores at the national and state levels. Below, we examine the percentage of students scoring proficient or advanced and the average scale scores on the test more closely.

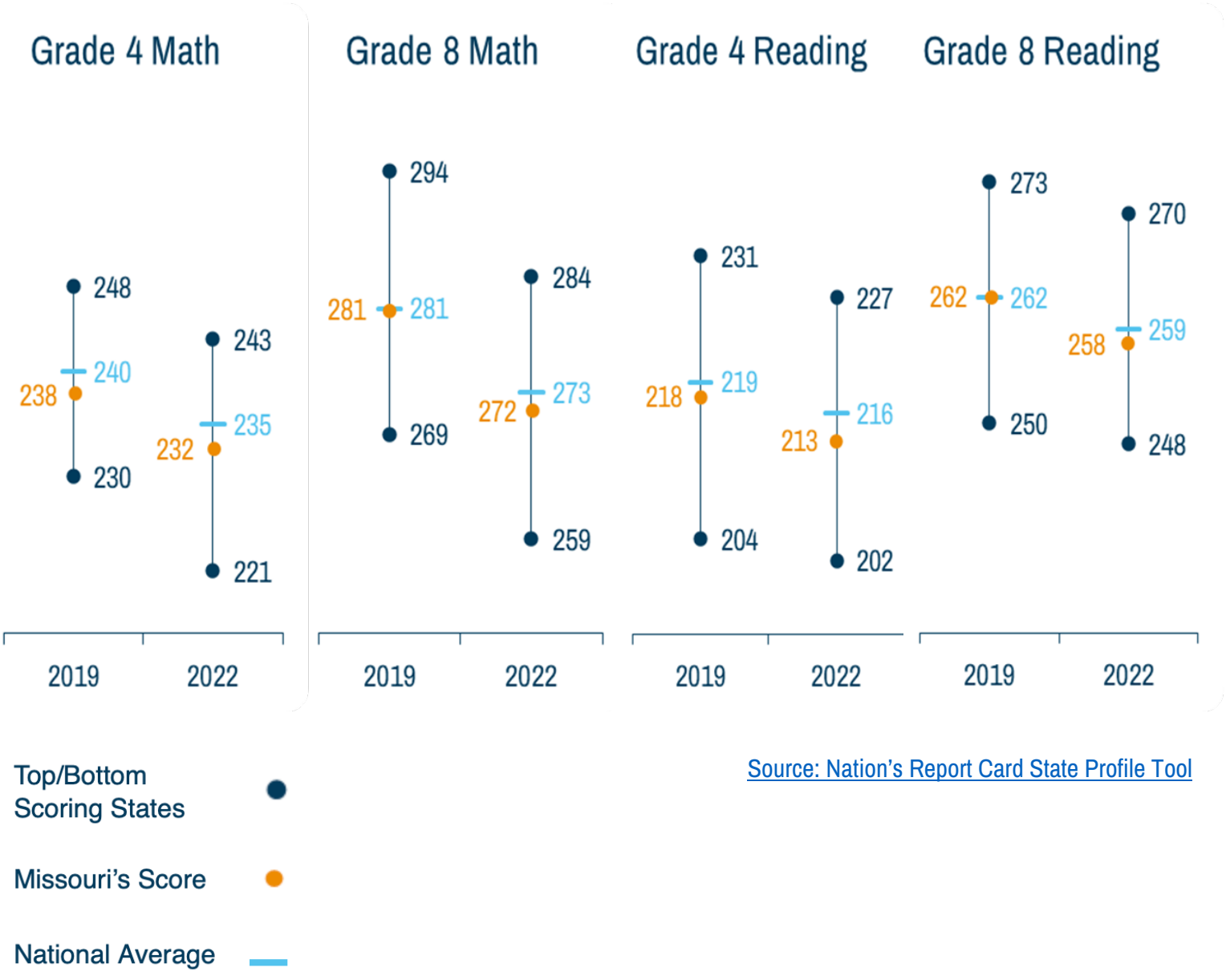
NCES reports the percentage of students scoring proficient or advanced on the Main NAEP assessment for each state (plus the District of Columbia)[9]. Below (Figure 9) is a chart showing the range of percentages of students scoring proficient or advanced in 4th and 8th Grade Reading and Math for the 50 states and DC. The top of each vertical bar represents the highest-scoring state, while the bottom represents the lowest-scoring state. The blue horizontal line in the middle represents the national average, while the orange dot in the middle represents Missouri. In September 2022, the PRiME Center reported the 2019 percentages for 4th and 8th Grade Reading and Math. We are now able to compare those with 2022's results. Although we see declines in proficient and advanced-scoring students for both Reading and Math, we see more significant drops in Math for both 4th and 8th Grade. Missouri's scores remained within two percentage points of the national average percentage of students scoring proficient or advanced in 2022.

Figure 9. Percent of Students Scoring Proficient or Advanced on Main NAEP Assessment

Source: Nation's Report Card State Profile Tool

NCES also reports the average scale score for each jurisdiction. The test is scored on a scale of 0–500. Figure 10 shows the range of scale scores nationwide on the Main NAEP assessment. We can see that scores decreased across the nation over the period of the pandemic, with more significant declines in Math than in Reading. Both 4th and 8th Grade averages decreased by three scale score points in Reading, while they decreased by five and eight scale score points in Math, respectively. Missouri scored within three scale score points of the national average in 2022.

Figure 10. Scale Scores for Main NAEP Assessment (scale of 0-500)



Source: Nation's Report Card State Profile Tool

LTT NAEP Results

Traditionally, the NAEP Long Term Trends assessment takes place every four years. With an assessment given in Winter 2020, the next one was initially scheduled for Winter 2024. However, to gather data related to learning trends due to the COVID-19 pandemic, there was a special administration of the test given in Winter 2022 (January–March) for 4th Grade and Fall 2022 (October–December) for 8th Grade. The next administration of this test for both 4th and 8th Grade students will be in the Winter of 2025.

Last year, we were able to report on the fourth-grade scores from the LTT special administration. Table 3 below summarizes the results. To review, we saw significant declines for students over the course of the pandemic, with scores dropping by five and seven scale points for Math and Reading, respectively, from 2020 to 2022. The drop in Reading represented the most significant decline since the 1990s, while the decline in Math was the first ever recorded by the LTT. The declines were more pronounced for students in the 10th percentile compared to those in the 90th percentile and those who were eligible for the NSLP than those who were not. Last year's PRiME report can be found here.

Table 3. 9-Year-Old LTT NAEP Scores

9 YO	Mathematics			Reading		
Student Characteristic	2020 Scale Score	2022 Scale Score	Change	2020 Scale Score	2022 Scale Score	Change
Overall	241	234	-7	220	215	-5
90th Percentile	286	283	-3	267	265	-2
10th Percentile	191	178	-13	164	155	-9
Black	225	212	-13	205	199	-6
Hispanic	232	223	-9	210	204	-6
White	250	244	-6	228	223	-5
NSLP Eligible	229	221	-8	207	200	-7
NSLP Ineligible	254	249	-5	232	229	-3

Source: Nation's Report Card 2023 NAEP LTT Result Highlights

This year, we have also received the 8th Grade scores from the special administration. Note that NCES administered the 8th Grade assessment the school year after the 4th Grade assessment. See Table 4 below for the results.

Table 4. 13-Year-Old LTT NAEP Scores

13 YO	Mathematics			Reading		
Student Characteristic	2020 Scale Score	2023 Scale Score	Change	2020 Scale Score	2023 Scale Score	Change
Overall	280	271	-9	260	256	-4
90th Percentile	329	322	-7	308	305	-3
10th Percentile	228	213	-15	209	202	-7
Black	256	243	-13	244	237	-7
Hispanic	267	257	-10	250	247	-3
White	291	285	-6	269	264	-5
NSLP Eligible	264	253	-11	247	243	-4
NSLP Ineligible	294	287	-7	273	268	-5

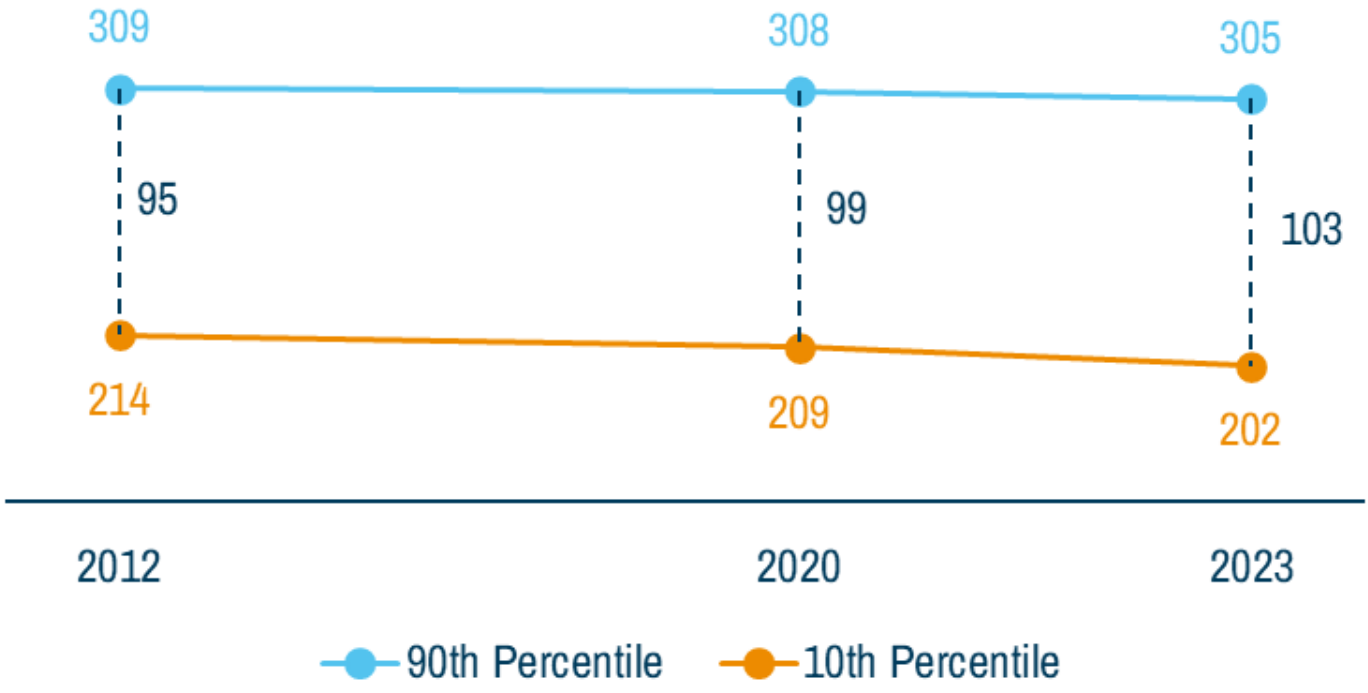
Source: Nation's Report Card 2023 NAEP LTT Result Highlights

We can see that as with the previous year's results, scores declined from 2020 to 2023 overall and across all performance level, race, and NSLP categories.

NAEP Trends by Student Performance

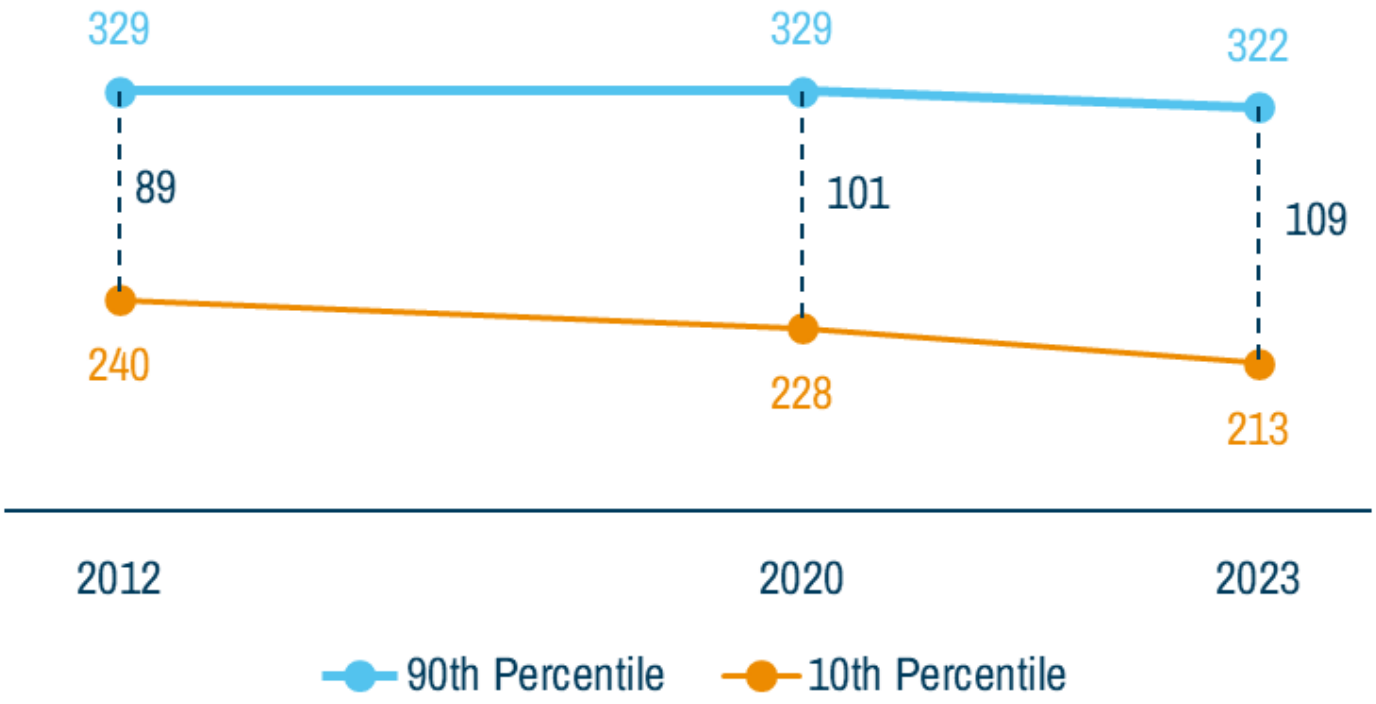
Nationally, scores for the bottom 10th percentile of students dropped by more than double the amount of scale score points than their peers in the 90th percentile in both subjects tested. The average scale score of students in the 10th percentile dropped by 15 points in Math and seven points in Reading, while the average score for those in the 90th percentile dropped by only seven and three points, respectively. Additionally, the gap between the 10th and 90th percentile students is widening in both subjects. Since 2012, the gap between the top and bottom 10 percent of students has grown by eight points in Reading (Figure 11) and by 20 points in Math (Figure 12).

Figure 11. 13-Year-Old NAEP LTT Reading Scale Scores by Performance Level



Source: Nation's Report Card Data Explorer

Figure 12. NAEP LTT Math Scale Scores by Performance Level

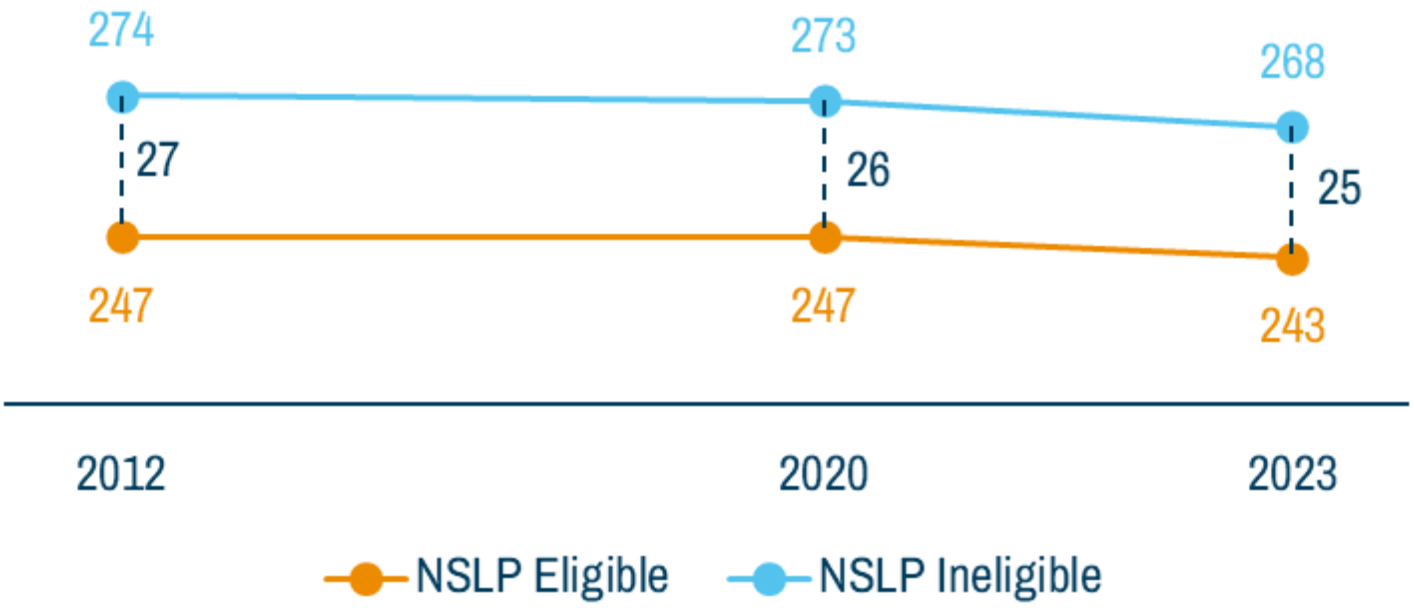


Source: Nation's Report Card Data Explorer

NAEP Trends by National School Lunch Program

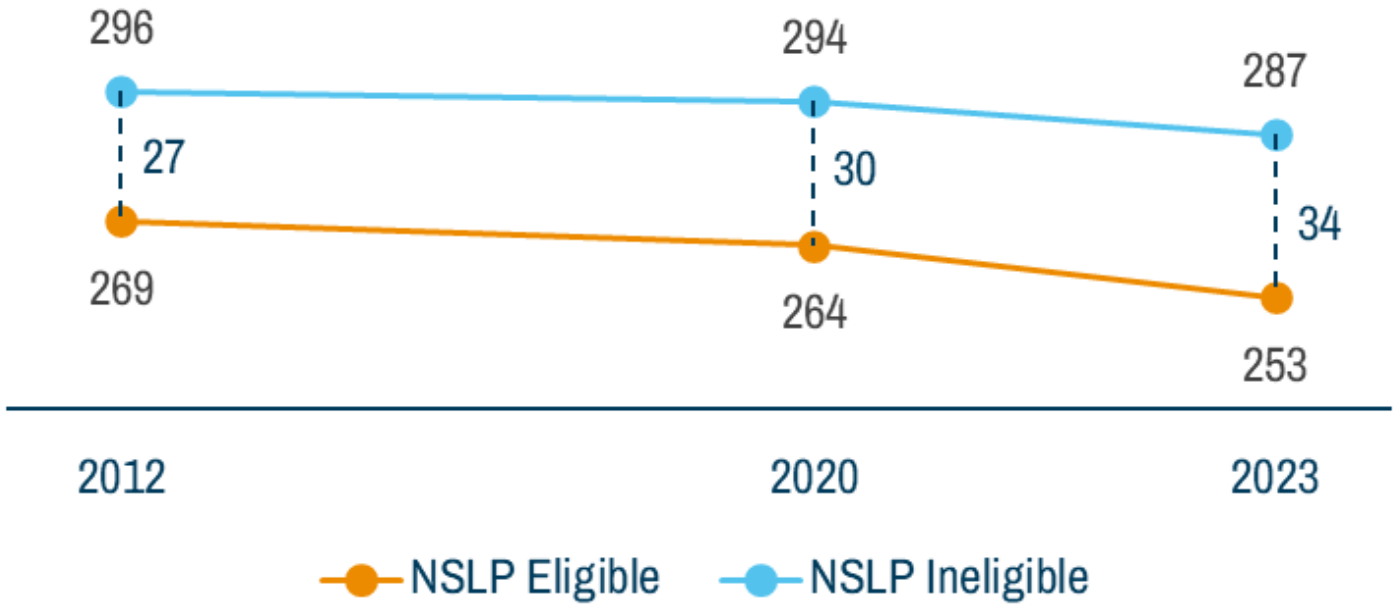
Over the measured time frame, scores of NSLP-eligible students declined more than those who were NSLP-ineligible in Math but not in Reading. Additionally, we see the gap between NSLP-eligible and NSLP-ineligible students growing in Math, widening from 27 to 34 points. Meanwhile, the gap in Reading has shrunk by 2 scale score points in the same time span. While the NSLP eligibility did not appear to affect declines in Reading, it is worth noting that the average scale score for NSLP-eligible students was still 25 points lower than NSLP-ineligible students.

Figure 13. 13-Year-Old NAEP LTT Reading Scale Scores by NSLP Eligibility



Source: Nation's Report Card Data Explorer

Figure 14. 13-Year-Old NAEP LTT Math Scale Scores by NSLP Eligibility



Source: Nation's Report Card Data Explorer

4 Conclusions

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State and national-level testing exists as part of larger accountability systems. Various stakeholders make important decisions based on the results of these tests. Although standardized testing is without question only part of the picture, it is imperative that we look closely at the data for what it can and cannot tell us.

At the state level, the most recent set of MAP results show that scores have not returned to pre-pandemic levels. There are signs of recovery in Math after a 2021 low, with Grades 6 and 7 fully reaching or surpassing their 2019 scores. However, ELA scores have not similarly rebounded. Although ELA scores did not drop by as many scale score points on average over the course of the pandemic, scores have been slow to bounce back, if at all, as some grades' average scores have continued to decline.

Additionally, we see a large and persistent gap between the scores of students who are NSLP-eligible and those who are not, aligning with what we see at the national level. The gap widened slightly for fourth-graders in Math and ELA, but shrunk slightly for eighth-graders in both subjects.

The results of state tests are consistent with results on the NAEP. Scale scores declined across 4th and 8th Grade Math and Reading from 2019 to 2022; Missouri's scores declined while continuing to hover around the national average (which also declined).

While we cannot exactly compare results from different tests since the tests measure different skills (as discussed above) and are reported in different scales, we can draw conclusions when looking at the data as a whole. Table 5 below shows a comparison of the score changes since 2019. The most recent results are from 2022 for the NAEP, from 2023 for the MAP. Changes are presented in terms of standard deviations, in order to compare the changes in similar units of measurement.

At both the state and national levels, scores declined in both ELA and Math in both 4th and 8th grade. While the results in ELA are comparable, the math declines on NAEP are much more significant than on the MAP scores.

The declines in ELA are significant and meaningful across data sets. The results in Math are more promising when looking at Missouri MAP, compared to the NAEP. While the 4th and 8th grade math decline in Missouri MAP Scores are slightly negative at -0.03 and -0.02 standard deviations respectively, the declines on NAEP are much larger. Math scores on the 4th grade NAEP declined by-0.1875 standard deviations, and in 8th grade by -0.2432. These are large and meaningful declines.

So, the recent release of 2023 MAP scores gives hope for a bounce back in some subjects. The NAEP has yet to show similarly optimistic results. The reasons for these discrepancies are a subject for future research. The answer could be as simple as sampling. The NAEP captures only a small sample of Missouri students, while MAP attempts to capture all students in a given grade. There also could be a question of test content: the subjects emphasized in NAEP tests may be different than the Missouri MAP, so NAEP tests may be missing so areas where Missouri students have rebounded post-pandemic, while emphasizing areas where students continue to struggle. Many other explanations exist, and this is an important, vital subject for future research.

Overall, Missouri test scores in Reading, ELA and Math are still below post-pandemic levels. These results of course aren't unique to Missouri. For the United States as a whole, NAEP LTT showed declines across 4th and 8th Grade Math and Reading from 2020 to 2022 (9-year-olds) and 2020 to 2023 (13-year-olds). Inequalities in outcomes are growing. When parsing out results by student groups, scores for the bottom 10th percentile of 13-year-old students dropped by more than double the amount of scale score points than their peers in the 90th percentile on the 2023 NAEP LTT assessment. Gaps between students eligible for

the NSLP and those who are not were exacerbated by the pandemic in Math, but not in Reading.

Test scores are just one piece of the conversation about schools and students. Standardized tests can be controversial and overused. But the declines in performance after the COVID-19 pandemic are too big to ignore. While conversations about the future of education policy in Missouri must go beyond tests, the most recent Missouri MAP results show that recovering lost Math and ELA skills must remain a central focus.

Table 5. Comparing National and State Level Test Scores

Missouri Test Scores Change in Standard Deviations 2019 to 2022		
Grade and Subject	**MAIN NAEP**	**MAP**
Grade 4 Math	-0.1875	-0.0323
Grade 4 Reading (NAEP)/ELA (MAP)	-0.1250	-0.0763
Grade 8 Math	-0.2432	-0.0179
Grade 8 Reading (NAEP)/ELA (MAP)	-0.1389	-0.1250

References

[1] Missouri Department of Elementary and Secondary Education (n.d.). *Guide to the Missouri Assessment Program.* https://dese.mo.gov/quality-schools/assessment/guide-missouri-assessment-program

[2] Missouri Department of Elementary and Secondary Education (n.d.). *Guide To The Missouri Assessment Program 2023–2024.* https://dese.mo.gov/media/pdf/guide-missouri-assessment-program

[3] Missouri Department of Elementary and Secondary Education. (n.d.). *Missouri Assessment Program Information For Parents.* https://dese.mo.gov/media/pdf/asmt-map-info-parents

[4] Missouri Department of Elementary and Secondary Education. (2022). *MAP Grade-Level Assessment Spring 2022 Guide To Interpreting Results - Parent Version.* https://dese.mo.gov/media/pdf/map-grade-level-assessment-spring-2022-guide-interpreting-results-parent-version

[5] U.S. Department of Agriculture. (2023, July 31). *National School Lunch Program.* https://www.fns.usda.gov/nslp

[6] National Center for Education Statistics. (n.d.). *About NCES.* https://nces.ed.gov/about/

DESE Data Sources

2022-23 MAP Scale Scores
2022-23 MAP Percent of Students Proficient and Advanced
2018-21 MAP Scale Scores and Percent of Students Proficient and Advanced
2023 MAP Data for FRL-Eligible Students
2022 MAP Data for FRL-Eligible Students
MAP Score Standard Deviations

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About the Authors

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This policy brief was released on December 18, 2023, the same day that 2022-23 Missouri MAP Scores were released. It will be updated.