Curriculum Associates®

i-Ready®

The State of Student Learning in 2022

Annual Report, September 2022

Contents

Contents, Cont'd.

Introduction

Background

Addressing students' unfinished learning is recognized as a top priority in classrooms, district offices, state boards of education, and the US legislature. Congress has allocated an unprecedented $190 billion to support schools through the Elementary and Secondary School Emergency Relief (ESSER) fund with at least 20% of ESSER earmarked for addressing learning recovery (OESE, 2020; 2021a; 2021b). A substantial body of research has emerged around student academic performance during the pandemic, with many research organizations documenting deeper educational challenges in the wake of the pandemic.

Even before the pandemic, the most recent data from the National Assessment of Educational Progress (NAEP) in 2019 showed that only one-third of all Grade 4 students were proficient in reading and mathematics before the pandemic, with even fewer Black and Latino students meeting NAEP's proficiency standards (i.e., 18% and 23%, respectively, in reading and 20% and 28%, respectively, in mathematics). The unsettling truth is that these inequities have been in place since NAEP first began assessing our nation's students more than 60 years ago.

Our past research found that fewer students in Grades 1–8 were on grade level compared to pre-pandemic historical averages and that mathematics performance was more negatively impacted by the pandemic than reading (Curriculum Associates, 2020; 2021a; 2021b; 2021c). We and others have noted that historical inequities based on race, ethnicity, and socioeconomic status have been further exacerbated by the learning circumstances during the pandemic (Goldhaber et al., 2022). Even school districts with broadband and internet-connected devices in place for all students during school closures experienced pervasive unfinished learning (Bryant et al., 2022).

Learning recovery will undoubtedly vary by district, school, classroom, and students' unique needs, but one common educational goal is to ensure all students are able to read grade-level content with fluency and comprehension as well as to be able to develop deep conceptual and procedural understanding of grade-level mathematics. As a nation, we are at a unique inflection point in history to accelerate learning, redress the educational shortfalls encumbering vulnerable student groups, and build data-informed school systems for the future.

Eleven million students completed the *i-Ready Diagnostic* assessment during the 2021–2022 school year. At Curriculum Associates, we believe that the primary goal of assessment should be to provide actionable information to educators. As a natural extension of our mission to make classrooms better places for all, we hope that regularly releasing research findings born out of our classroom assessments can empower educators, policy makers, and community members to improve educational outcomes for all students in an equitable manner.

Research Purpose

A clear assessment of the current state of students' reading and mathematics competencies is essential to acting decisively in the short term to improve outcomes for students and educators in the long term. This report describes reading and mathematics assessment results from the 2021–2022 school year completed by nearly two million of the nation's Grades K–8 students. Our findings provide detailed and timely information that can be used to drive the delivery of targeted, data-driven instruction in the classroom as well as to influence allocation of resources such as ESSER funding, pre-service training, and professional development at the district and state level.

At the time of publication, this report reflects data from the only assessment administered within classrooms that includes all of the following:

- **Reading and mathematics data from elementary and middle school students.** Other organizations have published reports of student achievement that are limited to the grades for which state assessment data is collected, typically Grades 3–8, or have aggregated the results of all grades together when reporting findings. In this report, we provide reading and mathematics results for Grades 1–8. Findings are shown by grade level to illustrate the different pattern of strengths, challenges, and needs emerging from the pandemic.
- **Achievement data relative to a pre-pandemic baseline.** In this report, we provide student achievement data from both spring 2021 and spring 2022 relative to a pre-pandemic baseline (i.e., spring 2018 and spring 2019).
- **Criterion-referenced grade-level performance data.** The *i-Ready Diagnostic* provides multiple assessment metrics including scale scores, norm-referenced percentiles, and criterion-referenced grade-level placements. In this report, we will show how students are faring relative to their grade-level expectations. Criterion-referenced assessments are aligned to grade-level content standards and provide information on students' mastery of specific skills—not simply a student's relative standing compared to a reference group, as is the case for norm-referenced-only assessments.
- **Within subject-area domain-level data.** A unique asset of the *i-Ready Diagnostic* is that students' achievement is measured overall by subject area (i.e., reading and mathematics) as well as by domain. The intent of the *i-Ready Diagnostic* is to help identify each student's specific areas of academic strength and challenge and to measure academic growth throughout the school year. The Diagnostic provides comprehensive insight into student learning across multiple domains in reading and mathematics. Reporting assessment results by domain can help narrow the focus of need and facilitate the delivery of more targeted supports in the classroom.

Our hope is that providing criterion-referenced grade-level results for elementary and middle school students in reading and mathematics with domain-level data now will help influence the allocation of resources to address unfinished learning within specific content areas.

State of Student Learning: Key Findings

1. **Elementary and middle school student achievement in spring 2022 is still behind pre-pandemic averages in both reading and mathematics.**

2. **In reading, most grades saw some improvements in achievement from spring 2021 to spring 2022.**
   - However, students in Grades 1–3 continue to experience the largest setbacks. For example, in the reading domain of Phonics, more students in Grades K–3 are below grade level and fewer students are on grade level compared with pre-pandemic averages.
   - Upper-elementary and middle school students are nearing pre-pandemic levels of reading achievement. However, it is important to note that prior to the pandemic, less than half of all Grades 6–8 students were on grade level.

3. **In mathematics, upper-elementary (i.e., Grades 3–5) and early middle school (i.e., Grade 6) students are still furthest behind the pre-pandemic averages.**
   - Students in Grade 4 saw some of the largest gains (i.e., 5 percentage points) in spring 2022 relative to spring 2021. Despite this improvement, Grade 4 students remain 11 percentage points behind the pre-pandemic average. Foundational mathematics skills are still a concern. More students need support in the domain of Number and Operations than ever. From spring 2021 to spring 2022, students in Grades 1–3 saw some improvements relative to the pre-pandemic benchmark with an increase in the percentage of on-grade level achievement, while students in Grades 5–8 saw a decrease, falling further behind the pre-pandemic benchmark.

4. **Results disaggregated by race, ethnicity, or income level reveal that historical inequities in achievement persisted.** In most grade levels and subject areas, the results for students in historically marginalized groups were exacerbated by the pandemic.
   - However, some of the grade-level data illustrate that the achievement of historically marginalized students is slightly stronger at the end of the 2021–2022 school year than it was one year ago in spring 2021. The greatest recovery occurred in Grade 4, for both reading and mathematics, in schools serving majority Black or majority Latino students.

5. **The performance of students who began the school year below grade level is bleaker.** In both reading and mathematics, the percentage of students who were below grade level generally remained the same or increased from 2021 to 2022, indicating that the distance from the historical average is growing. This observation is true for nearly all grade levels and both subjects.

Methodology

Research Questions

The primary research questions addressed in this report are:

1. By subject and grade level, how does student achievement at the end of the 2021–2022 school year compare to a historical baseline and to the end of the previous school year?
2. How does student achievement in specific reading and mathematics domains at the end of the 2021–2022 school year compare to a historical baseline and to the end of the previous school year?
3. How does student achievement at the end of the 2021–2022 school year vary by the racial or ethnic makeup of schools and compare to a historical baseline and to the end of the previous school year?
4. How does student achievement at the end of the 2021–2022 school year vary by the median household income of schools' locations and compare to a historical baseline and to the end of the previous school year?

Assessment Measure

The assessment measure in this study is Curriculum Associates' *i-Ready Diagnostic* for Reading and for Mathematics for Grades K–8 students. The Diagnostic is an online, interim, adaptive, and criterion-referenced assessment of student learning for reading and mathematics that is built on the college- and career-readiness standards and provides grade-level placements. In reading, the content strands (i.e., domains) assessed are Phonological Awareness, Phonics, High-Frequency Words, Vocabulary, Comprehension: Literature, and Comprehension: Informational Text. In mathematics, the domains assessed are Number and Operations, Algebra and Algebraic Thinking, Measurement and Data, and Geometry. Most school districts administer the Diagnostic to students three times during the school year in fall, winter, and spring.

To learn more about the *i-Ready Diagnostic*, including a discussion of its reliability and validity, see the Appendices.

Sample

For this study, we examined grade-level placement results from students in spring 2021 and spring 2022 compared to prior school years (i.e., historical baseline). We constructed a historical baseline to represent typical performance for Grades 1–8 students across the two most recent pre-pandemic school years when data was available: 2017–2018 and 2018–2019. The 2019–2020 school year was not included, as there was missing data in most schools across the country in spring 2020 due to the pandemic and school closures.

In order to have a common basis of comparison across cohorts, we included students who tested in school in spring of each year. The spring 2022 cohort tested between March 2, 2022, and June 15, 2022. Student-level data was matched at the school level. For the spring 2022 testing window, the proportion of students who tested in school within a given school by subject by grade was between 50% and 200% of the number of students tested in the same school by subject by grade during the spring for the historical baseline.

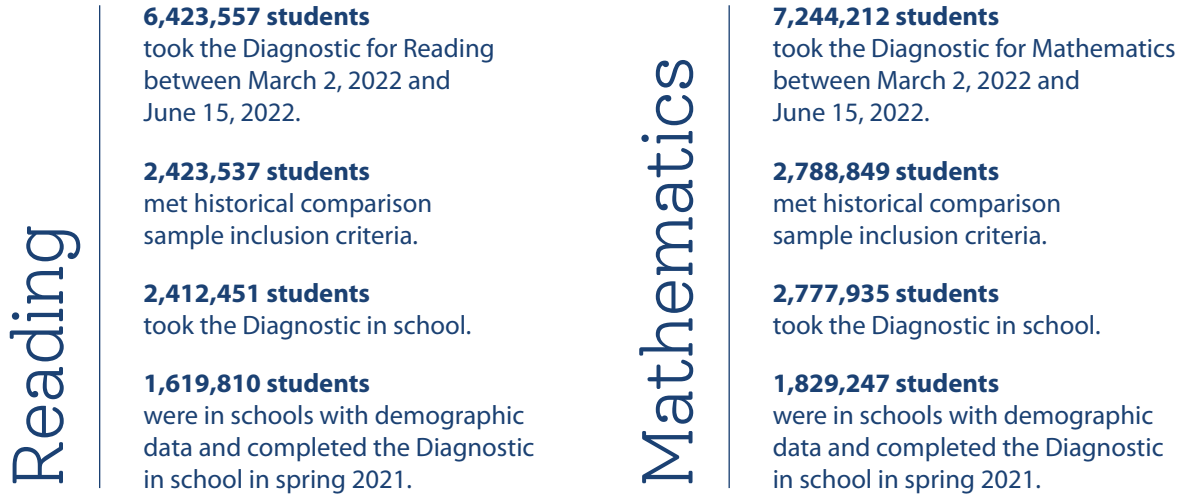
We selected students who were enrolled in Grades 1–8, did not rush on their spring assessment, and self-reported that their spring 2021 and 2022 *i-Ready Diagnostic*s were taken in school (for the historical sample, we assumed this was all students). To create school-level demographic groups, the data was sourced from the National Center for Education Statistics (NCES) Common Core of Data. To be included in the demographic data analyses, students had to belong to a school that was included in the NCES Common Core of Data in 2019–2020.

With these criteria in place, the final spring 2022 sample consisted of 1,619,810 students in Grades 1–8 who completed the *i-Ready Diagnostic* for Reading and 1,829,247 students in Grades 1–8 who completed the *i-Ready Diagnostic* for Mathematics. This analysis represents students from 49 states, plus the District of Columbia. The number of students per state varied by subject and is not statistically representative of each state. For the overall and demographic findings, the historical, 2020–2021, and 2021–2022 cohorts consist of students from the same schools. For the domain-level findings, the historical and current cohorts are composed of students from the same schools.

Additional detail on the methodology and sample description is provided in the Appendices.

Figure 1

How Was the Spring 2022 Assessment Sample Selected?



Results

Overview—Descriptive Analyses

In the following section, we report the findings for the descriptive analyses by subject—first reading and then mathematics.

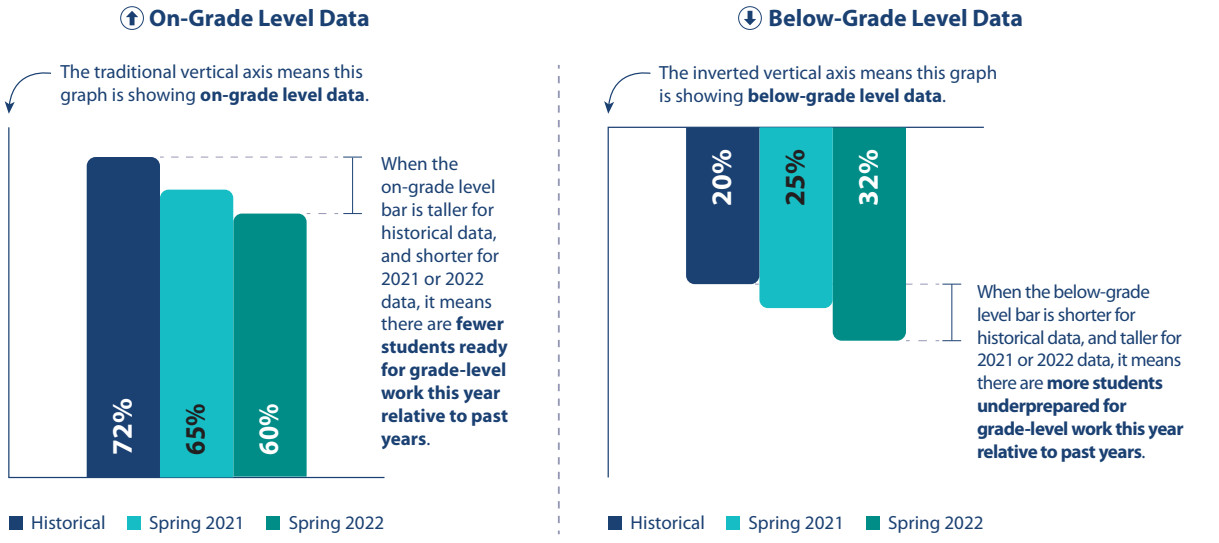
We begin by looking at differences between the most recent school year (i.e., 2021–2022) and a historical baseline that predated the pandemic as well as between the most recent school year and the prior school year (i.e., 2020–2021). In each subject, we examine overall and domain-level data. Finally, for each subject, we present the findings for demographic groups by race and ethnicity and by income level. These findings compose the basis of what we will describe as national data trends for students who are on and below grade level.

When students take the *i-Ready Diagnostic*, they are given a placement level relative to their chronological grade level that designates their performance as being on grade level, below grade level, or above grade level. For example, a Grade 5 student can place below grade level at the Grade 4 level (i.e., One Grade Level Below), at the Grade 3 level (i.e., Two Grade Levels Below), and at the Grades K–2 levels (i.e., Three or More Grade Levels Below). A Grade 5 student can also place above grade level at the Grades 6–8 levels (i.e., Above Grade Level). See the Appendices for the *i-Ready* placement-level descriptors.

Students who place Early On Grade Level have partially met grade-level college- and career-readiness standards, and students who are Mid or Above Grade Level have met or exceeded grade-level college- and career-readiness standards. Students who are Two or More Grade Levels Below are not yet close to meeting grade-level college- and career-readiness standards and may need additional instruction to fill in gaps in foundational concepts and knowledge. For the purposes of this report, students who placed Early On Grade Level or higher were designated as performing on grade level, and students who placed Two or More Grade Levels Below were designated as performing below grade level.

Figure 2

Understanding Grade-Level Placements in This Paper



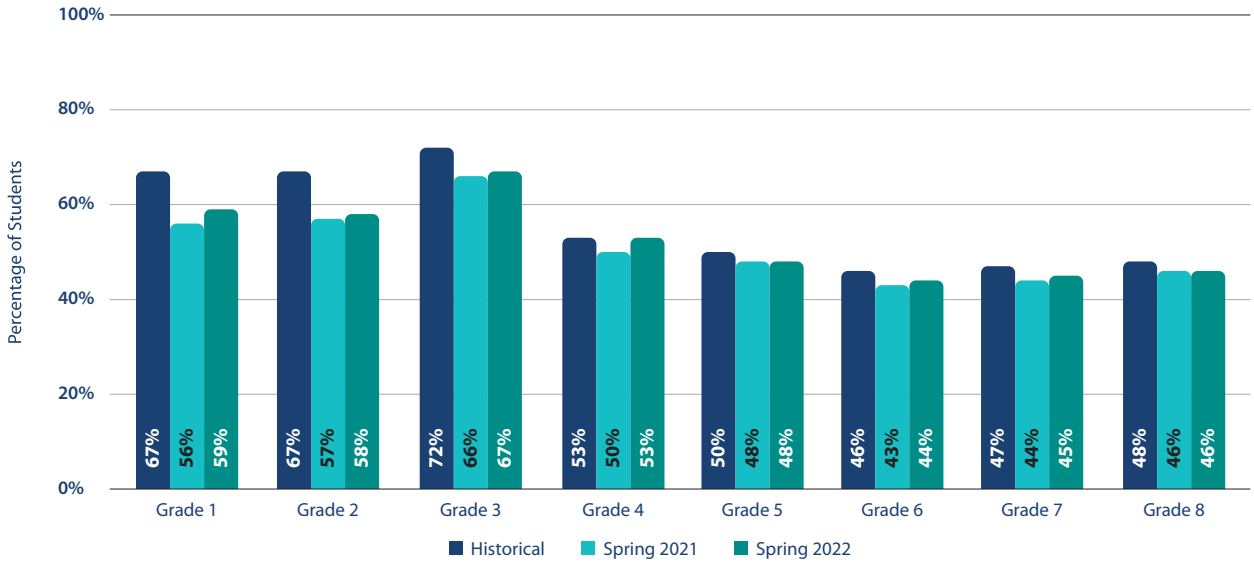
Reading

Overall Findings by Grade

How does student achievement in reading at the end of the 2021–2022 school year compare to a historical baseline and to the end of the previous school year?

Graph 1

On Grade Level by Cohort, Reading

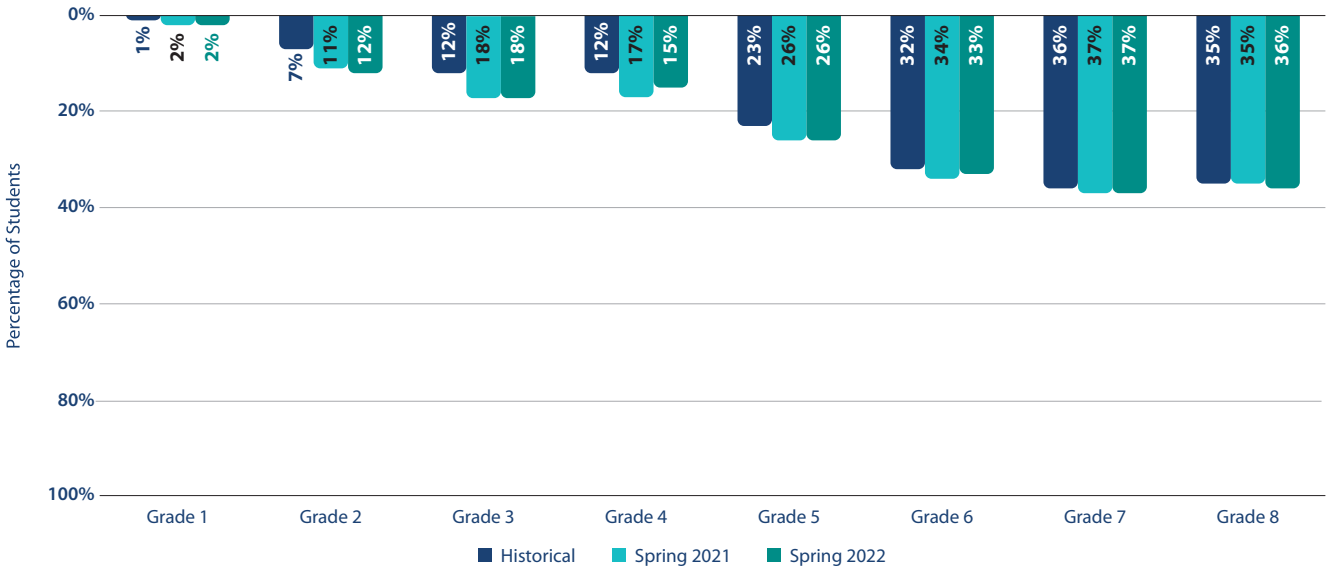


In Grades 1–8 reading, fewer students performed on grade level than prior to the pandemic. The largest discrepancies occur in Grades 1–3, the school years during which students are learning foundational reading skills. For Grades 4–8, there is only a 0- to 2-percentage-point difference between the most recent school year (i.e., spring 2022) and the historical baseline. For those grades, the percentage of students performing on grade level are approaching pre-pandemic numbers. However, it is important to recall that a reading crisis existed in the US prior to the pandemic. Although the differences between those two cohorts are minimal, only about half of Grades 4–8 students finished the 2021–2022 school year able to meet college- and career-readiness standards for their grade level.

In 2021–2022, most students in the US had the opportunity to return to in-person instruction. These data illustrate a positive trend for several grade levels, showing more students are on grade level than there were in spring 2021. In other words, although the differences between cohorts are small, it appears that after one year of in-person instruction, students are gaining some ground over the prior year in reading achievement. For Grades 5 and 8, there were no differences in reading between spring 2021 and spring 2022. In upper elementary through middle school, there is some evidence that reading performance is recovering or was not strongly impacted by the pandemic. However, multiple findings in this report indicate the reading achievement of early-elementary students has suffered.

Graph 2

Below Grade Level by Cohort, Reading



Across Grades 1–8, more students placed below grade level in reading than prior to the pandemic. This aligns with multiple reports (Curriculum Associates, 2021c; Lewis & Kuhfeld, 2021) that found more students have unfinished learning in reading. The greatest impact appears to be in Grades 2 and 3, in which the discrepancy compared to the historical baseline is 5 percentage points and 6 percentage points, respectively. In Grades 6–8, there is only a 1-percentage-point difference between the two cohorts. However, 33% to 37% of students in Grades 6–8 completed the 2021–2022 school year performing below their chronological grade level. There remains a significant need for targeted, intensive, and effective reading interventions across all grade levels.

There was minimal change between spring 2021 and spring 2022 in the percentage of students who scored below grade level in reading. For Grades 1–8 students, the percentages were nearly identical. The largest change was in Grade 4, for which fewer students placed Two or More Grade Levels Below (i.e., a decrease of 2 percentage points). On this broad, aggregate measure of reading, there was very little change when comparing the current school year to the year of instruction that was most disrupted by COVID-19.

To complement the placement-level findings, we also examined the median scale scores at each grade level. Some discernible differences in performance between spring 2021 and spring 2022 emerged. The median scale score in reading improved or stayed the same across Grades 1–8 in spring 2021 compared to spring 2022. In fact, in Grade 4, the median reading score is the same as prior to the pandemic. In Grades 5, 6, and 8, the median reading score is only 1 to 2 scale score points different than it was before the pandemic, per the historical baseline. For Grades 1–3 students, there is evidence of unfinished learning in reading. In particular, Grades 1 and 2 students have a lower median reading score (by 11 and 10 points, respectively) than prior to the pandemic. This finding likely reflects the difficulty of teaching early reading via a digital or remote format for part of these students' Grade K or Grade 1 years. A table of median reading scores by grade and cohort is included in the Appendices.

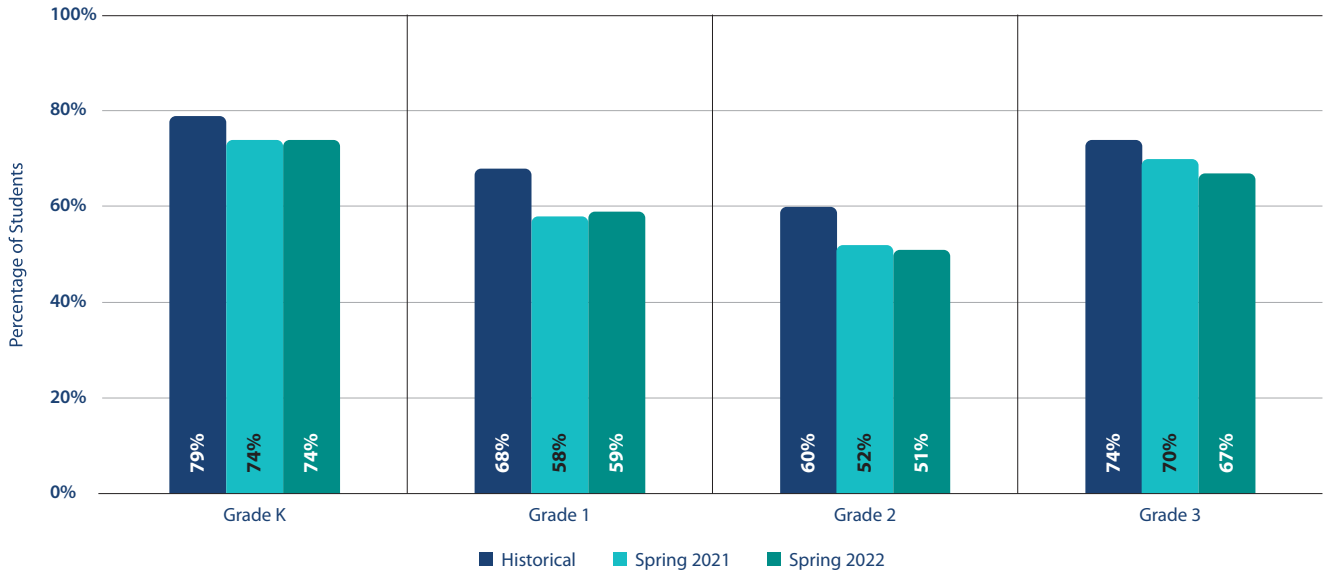
The findings reviewed thus far examine overall reading performance but may inadvertently obscure a bifurcation in young students' reading trajectories. That is, students who were able to learn the mechanics of reading, despite the challenges of an interrupted school year(s), will likely continue to grow in step with their current placement level. Students who needed support in grasping phonological awareness and phonics during remote or interrupted instruction will likely continue to fall further behind. In the next section, we consider this dilemma by examining student achievement within different reading domains.

Foundational Reading Skills Findings

How does student achievement in specific reading domains at the end of the 2021–2022 school year compare to a historical baseline and to the end of the previous school year?

Graph 3

On Grade Level by Cohort, Phonics



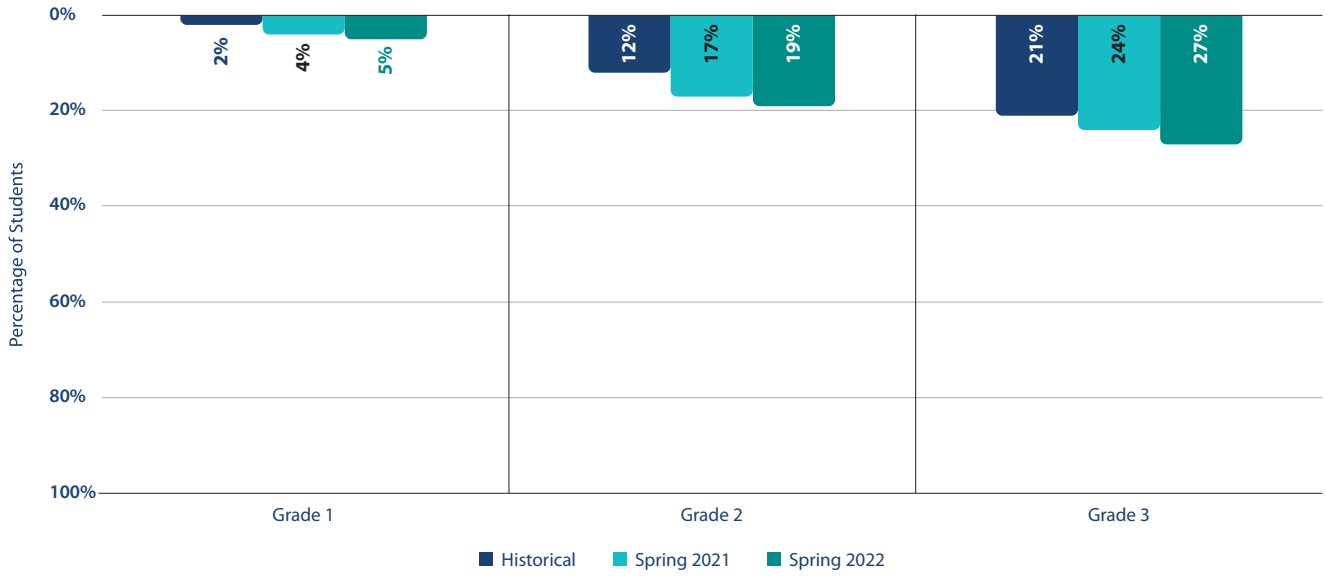
For domain-level data, Grade K is included in the on-grade level findings, but not the below-grade level findings. The lowest placement possible for a Grade K student is "Emerging K," or One Grade Level Below. Therefore, the designation of Two or More Grade Levels Below does not exist for Grade K students. In the test flow of the *i-Ready Diagnostic* for Reading, students in Grades K–2 are automatically assessed in the Phonics domain. However, students in Grades 3–8 are assessed in Phonics only if their scale score in the Vocabulary and Comprehension domains is below a specific benchmark. Thus, the percentages for students in Grade 3 represent the subset of students in Grade 3 who scored below that benchmark, were then assessed in Phonics, and received a placement level of Early to Late Grade 3.

In Grades K–2, there were 74%, 59%, and 51% of students, respectively, who performed on grade level at the end of the 2021–2022 school year. This is 5, 9, and 9 percentage points fewer students, by grade level, than at the end of the historical baseline. There was little to no change (i.e., 0 to 1 percentage points) when compared to the 2020–2021 school year. As we advance from Grade K to Grades 1 and 2, fewer and fewer students perform on grade level.

In fact, by Grade 2, only half of the students demonstrate grade-level performance in this essential reading skill. Not all Grade 3 students are assessed in Phonics. Thus, the increase in the percentage of on-grade level Grade 3 students should not be misinterpreted as an overall recovery of students' phonics achievement. Rather, the Grade 3 data should be considered separately from the Grades K–2 data. Of the subset of Grade 3 students who were assessed in Phonics, 67% placed on grade level in spring 2022, which was a 7-percentage-point decrease from prior to the pandemic.

Graph 4

Below Grade Level by Cohort, Phonics



Five percent of Grade 1 students and 19% of Grade 2 students were still below grade level in Phonics at the end of the 2022 school year. This was a 3- and 7-percentage-point increase, respectively, in the number of students needing support in Phonics than was observed during the historical baseline. The percentage of below-grade level Grades 1 and 2 students increased two years in a row. The percentages for students in Grade 3 represent the subset of Grade 3 students whose scale score in Vocabulary and Comprehension was below the benchmark threshold, were assessed in Phonics, and received a placement level of Grade 1 or lower. Year over year, the percentage of below-grade level students also increased for the subset of Grade 3 students assessed in Phonics. The findings have worrisome implications for these cohorts' future reading achievement if they do not receive effective phonics instruction to support them to achieve at grade level.

The Appendices include findings for student performance in the additional reading domains of Phonological Awareness, High-Frequency Words, Vocabulary, Comprehension of Literature, and Comprehension of Informational Text and adds Grades 4–8 data for Phonics.

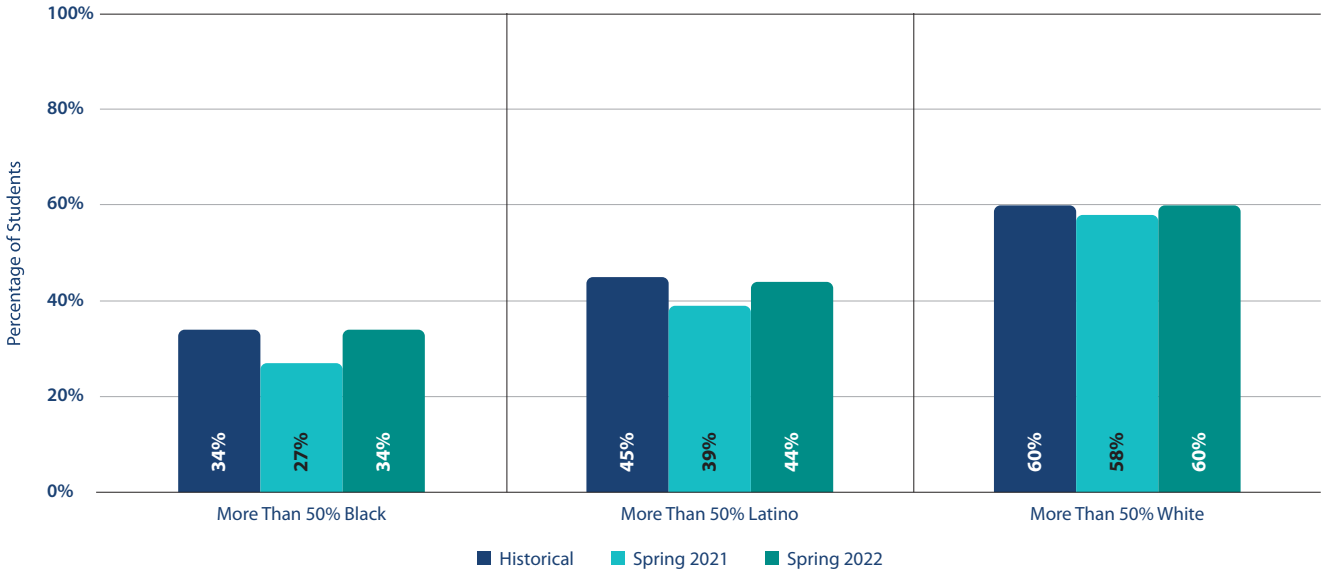
School–Level Demographic Data Findings

How does student achievement in reading at the end of the 2021–2022 school year vary by the racial or ethnic makeup of schools and compare to a historical baseline and to the end of the previous school year?

We looked at students' performance in overall reading by school-level demographics for race and ethnicity. Specifically, we looked at schools in which more than 50% of students are Black, White, or Latino. In Graphs 5 and 6, we share data from Grade 4 to illustrate variations by school-level demographics between the historical, spring 2021, and spring 2022 cohorts. The data for Grades 1–8 is presented in Tables 1 and 2.

Graph 5

On Grade Level by Schools Serving Majority Black, Latino, or White Students, Reading, Grade 4



Graph 5 illustrates that there were historical inequities in reading performance among these three school groups, and these inequities persisted throughout the pandemic. That is, prior to the pandemic, in schools serving majority Black students, 34% of Grade 4 students placed on grade level. In schools serving majority Latino students, 45% of Grade 4 students placed on grade level, while in schools serving majority White students, 60% of students placed on grade level. Those values dropped by 2 to 7 percentage points by spring 2021. By spring 2022, all three race or ethnicity school-level groups had returned within 1 percentage point to their pre-pandemic values. Although Grade 4 had this encouraging recovery, not every grade level fared as well, as illustrated in Table 1.

The percentage of students by cohort and school group who performed on grade level is presented in Table 1. Across most grades, the percentage of students who are ready for grade-level work has decreased across schools that serve a majority of Black, Latino, and White students in reading.

For schools serving more than 50% Black students, Grades 4 and 7 have returned to pre-pandemic percentages, and Grades 5 and 6 are within 1 percentage point. The results for students in schools serving less than 25% Black, Latino, and White students, as well as students in schools serving between 25% and 50% Black, Latino, and White students, are included in the Appendices.

Table 1

Percentage of Students ⬆ **On Grade Level** by Demographic Group—Spring Testing Window: Reading, Grades 1–8

	More Than 50% Black			More Than 50% Latino			More Than 50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	53%	39%	43%	60%	46%	49%	73%	63%	66%
2	49%	36%	39%	58%	45%	46%	74%	64%	65%
3	56%	46%	48%	64%	56%	57%	79%	74%	74%
4	34%	27%	34%	45%	39%	44%	60%	58%	60%
5	31%	28%	30%	42%	39%	41%	56%	54%	55%
6	28%	25%	27%	38%	35%	37%	52%	49%	51%
7	29%	25%	29%	37%	34%	38%	54%	50%	50%
8	33%	27%	29%	41%	40%	41%	53%	51%	50%

Graph 6

⬇ **Below Grade Level** by Schools Serving Majority Black, Latino, or White Students, Reading, Grade 4

When looking at Grade 4 school groups and students who placed below grade level in reading, it is clear that the existing inequities in performance persisted and were exacerbated by the pandemic. Pre-pandemic, in schools serving majority Black students, 21% of the Grade 4 students placed below grade level in reading. By the end of the 2021–2022 school year, that number had increased to 26%. By comparison, for schools serving majority White students, prior to the pandemic, 9% of Grade 4 students placed below grade level. That number increased to 11% in spring 2022.

In other words, these school groups began with different starting points, and the increase in the percentage of Grade 4 students placing below grade level in majority Black schools was two and one half times the increase in the percentage of Grade 4 students placing below grade level in majority White schools. The increase for schools serving majority Latino students was similar to that of schools serving majority Black students. Prior to the pandemic, 17% of Grade 4 students in these schools needed support in reading. That number increased by 4 percentage points during the spring 2022 assessment.

Table 2

Percentage of Students ⓘ **Below Grade Level** by Demographic Group—Spring Testing Window: Reading, Grades 1–8

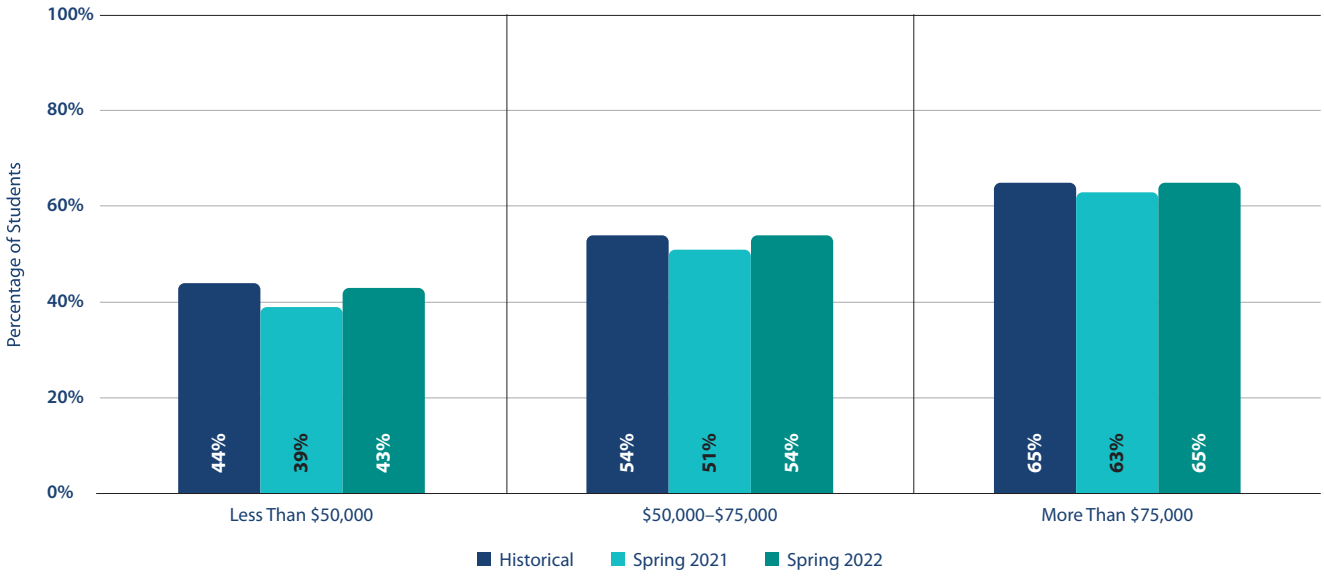
	More Than 50% Black			More Than 50% Latino			More Than 50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	2%	4%	4%	2%	4%	5%	1%	1%	1%
2	13%	22%	22%	10%	18%	19%	4%	7%	7%
3	21%	32%	31%	17%	25%	26%	8%	12%	13%
4	21%	32%	26%	17%	24%	21%	9%	11%	11%
5	37%	43%	42%	30%	34%	33%	18%	21%	20%
6	50%	52%	49%	40%	42%	40%	26%	28%	26%
7	55%	58%	54%	46%	48%	45%	29%	31%	31%
8	50%	56%	52%	42%	42%	41%	30%	31%	31%

How does student achievement in reading at the end of the 2021–2022 school year vary by the median household income of schools' locations and compare to a historical baseline and to the end of the previous school year?

We also looked at students' performance in reading, using a different school-level variable: median household income. Schools were combined into three groups: median household income less than $50,000, between $50,000 and $75,000, and greater than $75,000. Within each of those groups, we looked at the percentage of students who scored on grade level for Grades 1–8 as well as the percentage of students who scored below grade level.

Graph 7

On Grade Level by Median Household Income, Reading, Grade 4



Findings are illustrated in Graphs 7 and 8. Prior to the pandemic, there were differences by school-level median household income for both on-grade level and below-grade level performance.

As median household income level increases, so does the percentage of students who score on grade level in reading. During the historical baseline, the percentage of Grade 4 students by median income group was 44%, 54%, and 65%, respectively. There was a decline in each of those percentages by spring 2021. Then, by spring 2022, the percentages of Grade 4 students placing on grade level had rebounded within 1 percentage point across all three income groups. Table 3 illustrates that this rebound did not occur across all grade levels. In fact, for Grade 1 reading, there are fewer students on grade level across the three income-level groups (ranging from 6 to 9 percentage points lower).

Table 3

Percentage of Students **On Grade Level** by Income Group—Spring Testing Window: Reading, Grades 1–8

	Less Than $50,000			$50,000–$75,000			More Than $75,000		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	59%	47%	50%	69%	57%	60%	77%	68%	71%
2	58%	46%	48%	68%	57%	58%	77%	69%	70%
3	65%	57%	58%	74%	68%	68%	81%	77%	77%
4	44%	39%	43%	54%	51%	54%	65%	63%	65%
5	40%	38%	39%	50%	48%	49%	62%	60%	61%
6	38%	36%	37%	46%	44%	45%	57%	54%	55%
7	39%	37%	38%	48%	44%	45%	59%	57%	57%
8	40%	38%	38%	48%	47%	46%	59%	57%	57%

Graph 8

Below Grade Level by Median Household Income, Reading, Grade 4

A similar pattern is seen for Grade 4 students placing below grade level in reading. Prior to the pandemic, the percentage of students by median household income level was 16%, 12%, and 8%, respectively. In spring 2022, those values had increased across all three groups to 21%, 15%, and 10%. The increase in the percentage of students needing support in reading for schools with a median household income less than $50,000 was two and one half times that for families with a median income greater than $75,000.

Table 4

Percentage of Students **Below Grade Level** by Income Group—Spring Testing Window: Reading, Grades 1–8

	Less Than $50,000			$50,000–$75,000			More Than $75,000		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	2%	3%	3%	1%	2%	2%	1%	2%	2%
2	10%	16%	17%	6%	10%	11%	4%	6%	6%
3	16%	24%	24%	11%	16%	17%	8%	11%	11%
4	16%	23%	21%	12%	15%	15%	8%	10%	10%
5	30%	33%	34%	22%	25%	25%	15%	17%	17%
6	39%	40%	40%	31%	33%	32%	22%	24%	24%
7	43%	45%	44%	35%	37%	36%	24%	25%	26%
8	42%	43%	43%	34%	35%	35%	25%	25%	25%

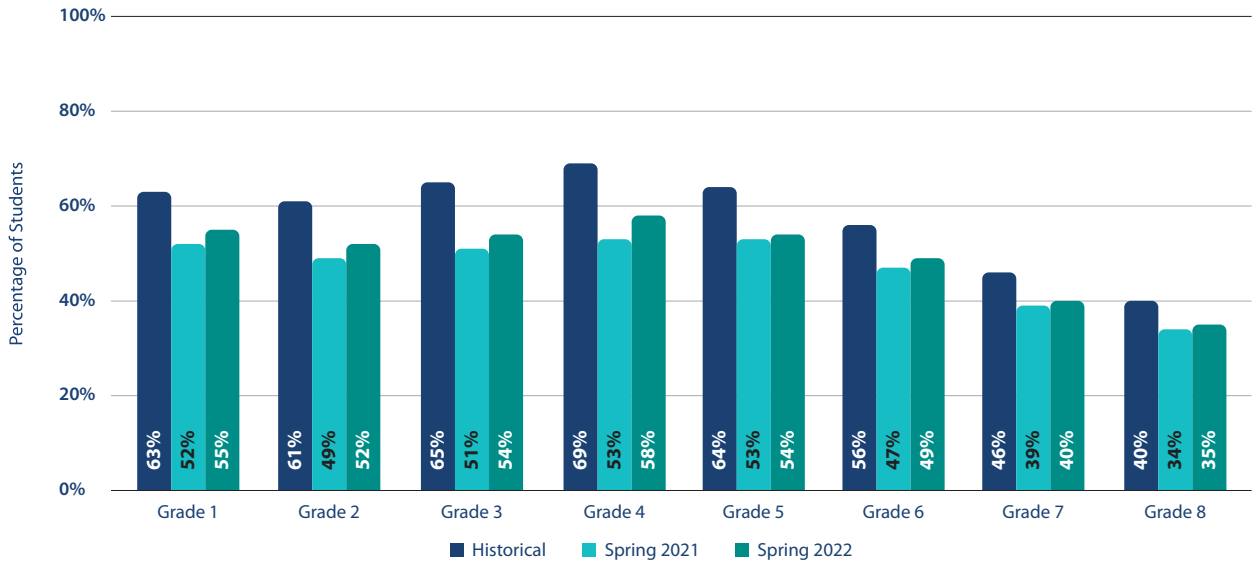
Mathematics

Overall Findings by Grade

How does student achievement in mathematics at the end of the 2021–2022 school year compare to a historical baseline and to the end of the previous school year?

Graph 9

On Grade Level by Cohort, Mathematics

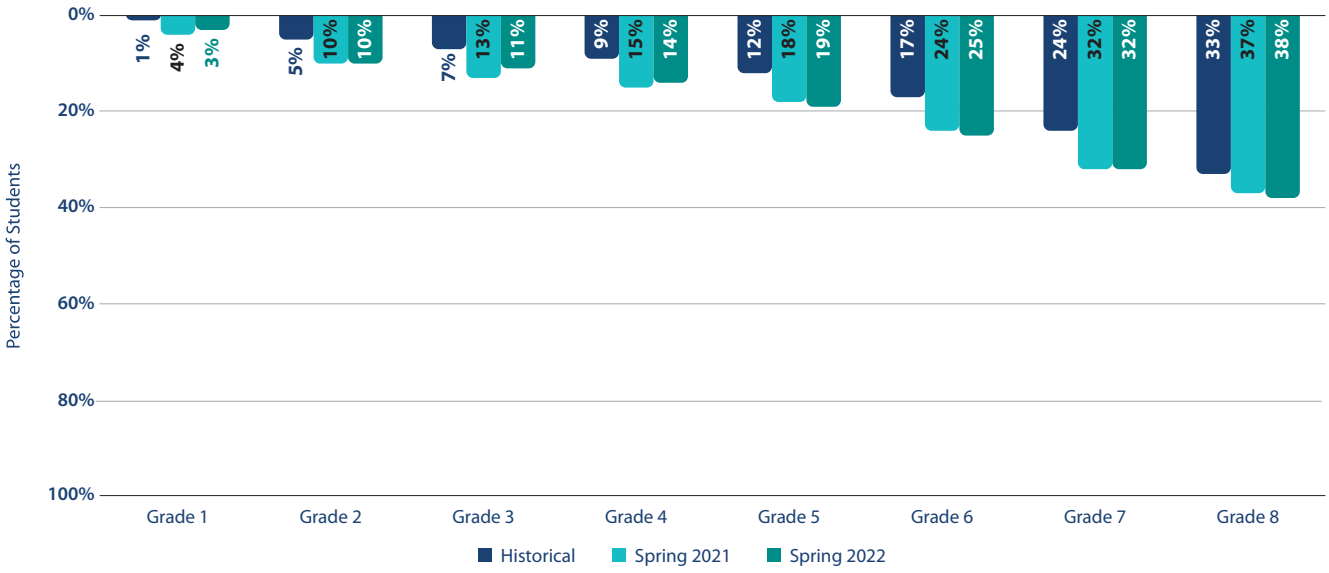


Across all Grades 1–8, there are fewer students placing on grade level in mathematics than there were prior to the pandemic. The largest differences occur in Grades 3–5, for which there are 10 to 11 percentage points fewer students whose mathematics assessments indicate they have met minimum grade-level college- and career-readiness standards. Approximately two-thirds of students in Grades 3–5 placed on grade level prior to the pandemic. In Grades 6–8, only one-third to one-half of students completed the 2021–2022 school year on grade level in mathematics. For students in Grades 4–8, mathematics performance was impacted by the pandemic more than their reading performance.

In Grades 1–8, there was a 1- to 5-percentage point improvement when comparing results from spring 2021 to spring 2022. In other words, after one year of in-person instruction, students were beginning to gain a little ground in mathematics. The greatest improvements between spring 2021 and spring 2022 occurred in elementary Grades 1–4.

Graph 10

Below Grade Level by Cohort, Mathematics



In Grades 1–8, there is a higher percentage of students who are placing below grade level. This aligns with multiple findings (Curriculum Associates, 2021c; Lewis & Kuhfeld, 2021) that more students have unfinished learning in mathematics than prior to the pandemic. In Grade 1, the change is just 2 percentage points. From Grades 2–8, there is a larger change in students placing below grade level, ranging from 4 to 8 percentage points more. Across the entire grade span and as chronological grades increase, more students ended the 2021–2022 school year below grade level. Toward the end of middle school, upward of one-third of students placed below grade level in mathematics (i.e., 32% in Grade 7 and 38% in Grade 8). These disquieting findings underscore the parallel need for targeted, intensive, and effective mathematics interventions, especially in Grades 4–8.

When comparing spring 2021 and spring 2022, there was very little change in the percentage of students who scored below grade level in Grades 1–8. Changes in percentage varied from 2 percentage points lower to 1 percentage point higher.

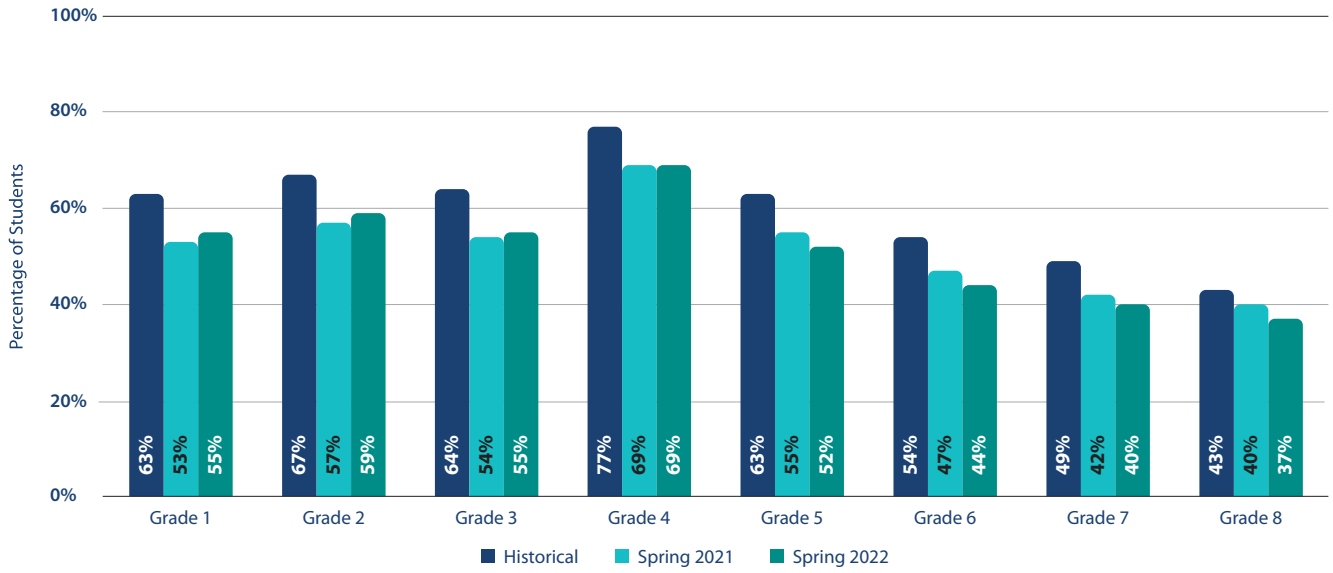
As with reading, there are differences in mathematics performance between these two cohorts when median score in mathematics is considered. For Grades 1–7, the median mathematics score improved or remained the same from spring 2021 to spring 2022. The median mathematics score for Grade 8 students is 1 percentage point lower than it was at the end of 2020–2021. At the same time, across all Grades 1–8, students' median mathematics score remains 5 to 9 percentage points lower than it was prior to the pandemic. The largest differences are seen for students in the intermediate elementary grades. Students in Grades 3–5 remain 8 to 9 points lower on their median mathematics score than they were during the historical baseline. This finding is especially problematic as mathematics content in Grades 4 and 5 is pivotal and predictive of mathematics performance in subsequent grade levels. In large, representative, longitudinal data sets, students' achievement and understanding of fractions and division in elementary school predicted their performance in algebra and overall high school mathematics, even after controlling for additional cognitive and demographic variables (Siegler et al., 2012). A table of median scores by grade and cohort is included in the Appendices.

Foundational Mathematics Skills Findings

How does student achievement in specific mathematics domains at the end of the 2021–2022 school year compare to a historical baseline and to the end of the previous school year?

Graph 11

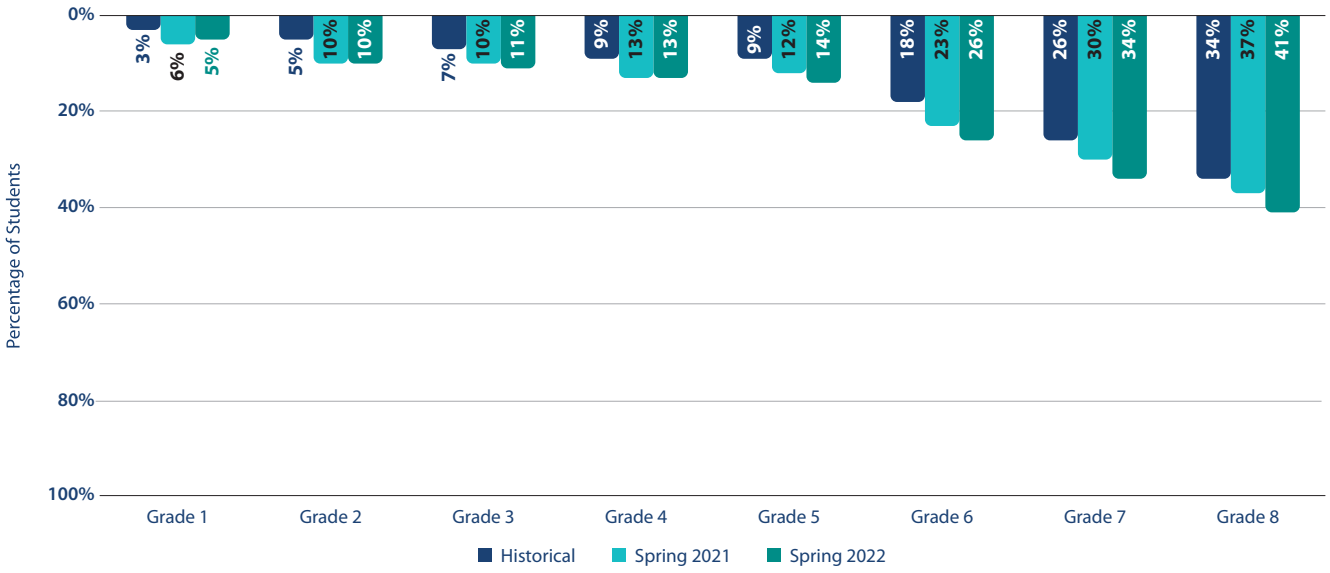
On Grade Level by Cohort, Number and Operations



The mathematics domain Number and Operations is foundational to students' understanding and performance in mathematics. As defined by the National Council of Teachers of Mathematics (NCTM), Number and Operations is the mathematical domain of understanding number systems, the relationships between numbers, mathematical operations such as addition, subtraction, multiplication, and division, and the skills of computation and estimation. Some specific skills included in this foundational domain include fractions, base ten, and place value. Across Grades 1–8, fewer students performed on grade level at the end of spring 2022 than before the pandemic. The differences range from 6 to 11 percentage points. Grade 4 has the highest percentage of students on grade level, at 69%, while Grade 8 has the fewest percentage of students on grade level at only 37%. In Grades 1–4, the percentage of students stayed the same or improved when comparing spring 2021 to spring 2022. Unfortunately, when making the same comparison for Grades 5–8, the percentage of students declined.

Graph 12

Below Grade Level by Cohort, Number and Operations



There was a similar pattern of findings for students performing below grade level. Across Grades 1–8, the percentage of students needing support below grade level with Number and Operations has increased since the historical baseline. The greatest increase occurred in Grades 6 and 7, for which there was an increase of 8 percentage points. When comparing spring 2021 to spring 2022, the percentage of students below grade level in Number and Operations mostly held steady in Grades 1–4. However, in Grades 5–8, the percentage of students in need of support gradually worsened. Students in upper elementary and middle school continue to lose ground in this key mathematics domain.

Furthermore, in Number and Operations, there is a large step-change in the percentage of students performing below grade level during the transition from Grade 5 to Grade 6. In Grade 5, only 14% of students are below grade level in Number and Operations, whereas in Grade 6, 26% of students performed below grade level. The percentage of students needing support in this domain continues to rise in middle school, with 34% and 41% of Grades 7 and 8 students below grade level at the end of the 2021–2022 school year.

The Appendices include findings for student performance in the additional mathematics domains of Algebra and Algebraic Thinking, Measurement and Data, and Geometry. Notably, the disquieting trends observed for Number and Operations are largely replicated, and in some cases they are more pronounced in these domains. For each of these domains, there is a lower percentage of students on grade level and a higher percentage of students below grade level than there was prior to the pandemic. There are domain-, placement-, and grade-level variations in the areas that show the greatest differences relative to the historical baseline. These variations can be reviewed in the corresponding tables in the Appendices.

In the comparisons between spring 2022 and the historical baseline, we observed some patterns of note. For students performing below grade level in Algebra and Algebraic Thinking, the gap has widened across all Grades 1–8. The differences are smaller for Grades 1 and 2 than for Grades 3–8. This pattern is similar for students performing below grade level in Measurement and Data. Some of the largest differences between spring 2022 and the historical baseline are observed in the Geometry domain, both for on-grade level and below-grade level students. For on-grade level students, the largest differences are observed for the youngest students. For below-grade level students in Geometry, the largest gap is for Grade 7 students.

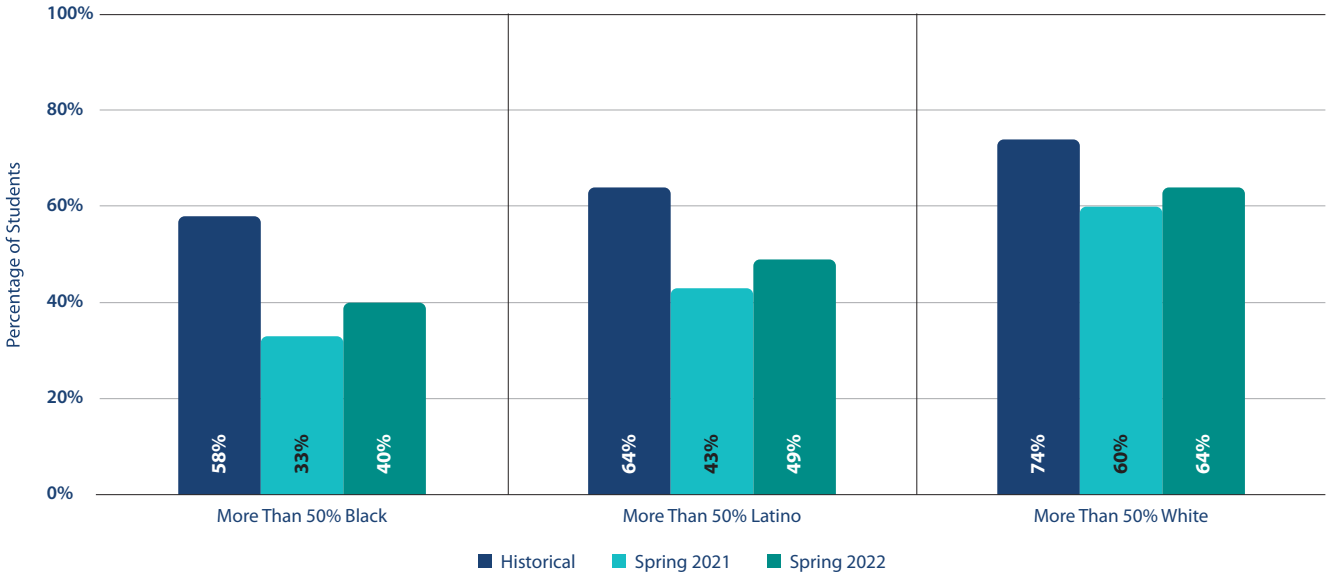
School–Level Demographic Data Findings

How does student achievement in mathematics at the end of the 2021–2022 school year vary by the racial or ethnic makeup of schools and compare to a historical baseline and to the end of the previous school year?

We also looked at Grade 4 students' performance in overall mathematics by school-level demographics for race and ethnicity. In Graphs 13 and 14, we share data from Grade 4 to illustrate variations by school-level demographics between the historical, spring 2021, and spring 2022 cohorts. The data for all grade levels is presented in Tables 5 and 6. For all groups, whether the school serves majority Black, White, or Latino students, there are fewer students performing on grade level in mathematics and more students performing below grade level than before the pandemic. The only exception is the percentage of Grade 8 below-grade level students in schools serving more than 50% Latino students.

Graph 13

On Grade Level by Schools Serving Majority Black, Latino, or White Students, Mathematics, Grade 4



Graph 13 illustrates there were historical inequities in Grade 4 mathematics performance among these three school-level groups, and these inequities persisted throughout the pandemic. That is, prior to the pandemic, in schools serving majority Black students, 58% of students placed on grade level. In schools serving majority Latino students, 64% of students placed on grade level, while in schools serving majority White students, 74% of students placed on grade level. Each of those percentages dropped dramatically by spring 2022. The decreases were larger for schools serving majority Black or majority Latino students (i.e., 18 and 15 percentage points, respectively) than for schools serving majority White students (i.e., 10 percentage points). In Grade 4, there were improvements between spring 2021 and spring 2022 for all three school-level groups. In fact, the improvements in Grade 4 were larger than were seen for any other grade level.

Table 5

Percentage of Students ⬆ **On Grade Level** by Demographic Group—Spring Testing Window: Mathematics, Grades 1–8

	More Than 50% Black			More Than 50% Latino			More Than 50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	47%	32%	37%	54%	39%	44%	69%	59%	62%
2	43%	27%	32%	52%	37%	41%	67%	56%	59%
3	50%	30%	36%	57%	39%	44%	70%	58%	61%
4	58%	33%	40%	64%	43%	49%	74%	60%	64%
5	48%	34%	34%	57%	43%	45%	69%	58%	60%
6	36%	28%	30%	45%	35%	39%	62%	53%	55%
7	27%	21%	23%	38%	33%	36%	53%	44%	45%
8	27%	21%	23%	25%	25%	27%	46%	39%	40%

Graph 14

⬇ **Below Grade Level** by Schools Serving Majority Black, Latino, or White Students, Mathematics, Grade 4

When looking at school groups and Grade 4 students who placed below grade level in mathematics, it is clear that the existing inequities in performance persisted and were exacerbated by the pandemic. Schools serving majority Black students suffered the most in overall mathematics performance during the pandemic school years. Before the pandemic, in schools serving majority Black students, 15% of the Grade 4 students placed below grade level in mathematics. By the end of the 2021–2022 school year, that number had increased to 26% of Grade 4 students.

In comparison, for schools serving majority White students, prior to the pandemic, 7% of Grade 4 students placed below grade level. That number increased to 11% in spring 2022. In other words, these school groups began with different starting points for Grade 4 students, and the increase in the percentage of students placing below grade level in majority Black schools was more than twice the increase in the percentage of students placing below grade level in majority White schools. The increase for schools serving majority Latino students was also greater—8 percentage points. That is, prior to the pandemic, 12% of Grade 4 students in majority Latino schools needed support in mathematics. That number increased to 20% during the spring 2022 assessment.

Table 6

Percentage of Students ⓘ **Below Grade Level** by Demographic Group—Spring Testing Window: Mathematics, Grades 1–8

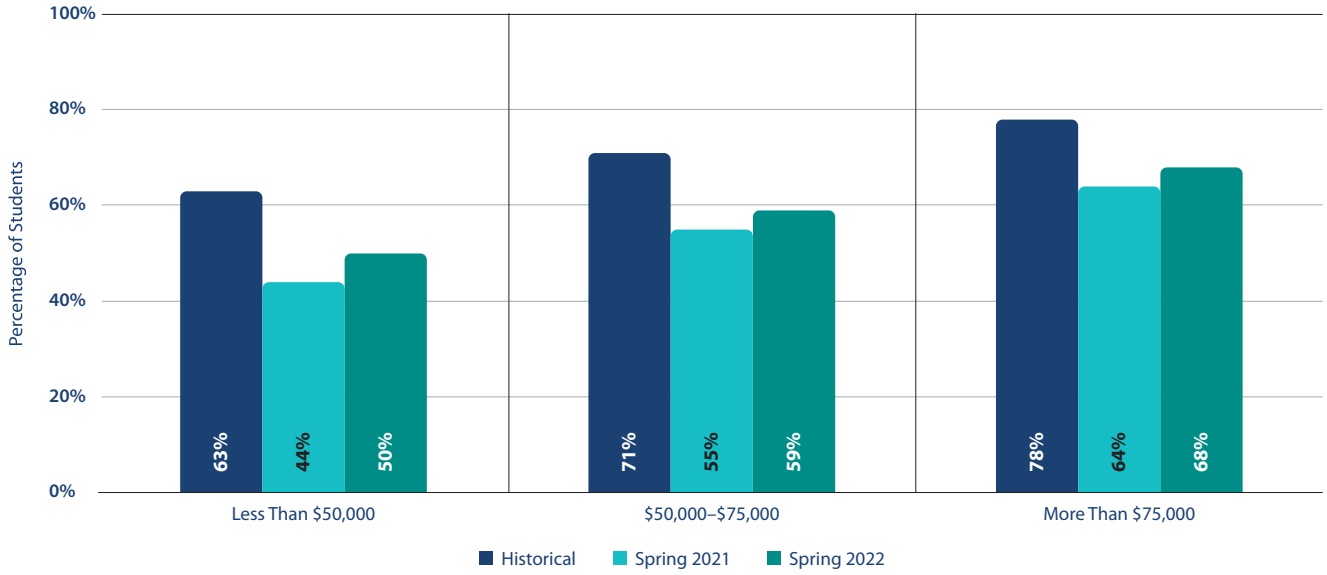
	More Than 50% Black			More Than 50% Latino			More Than 50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	2%	7%	6%	2%	6%	6%	1%	2%	2%
2	9%	20%	19%	7%	16%	15%	3%	7%	7%
3	12%	24%	20%	10%	20%	17%	5%	9%	8%
4	15%	29%	26%	12%	22%	20%	7%	11%	11%
5	20%	30%	33%	16%	25%	25%	9%	14%	14%
6	29%	40%	39%	24%	34%	33%	12%	20%	20%
7	41%	51%	51%	32%	40%	36%	19%	26%	27%
8	46%	53%	53%	48%	49%	48%	27%	32%	32%

How does student achievement in mathematics at the end of the 2021–2022 school year vary by the median household income of schools' locations and compare to a historical baseline and to the end of the previous school year?

We also examined students' performance in mathematics using the school-level variable of median household income. Findings are illustrated in Graphs 15 and 16.

Graph 15

On Grade Level by Median Household Income, Mathematics, Grade 4



Prior to the pandemic, there were differences in median household income for both on-grade level and below-grade level performance. As median income level increases, so does the percentage of students who score Early On Grade Level in mathematics. Each median income-level group begins with a very different percentage of Grade 4 students performing on grade level and above. During the historical baseline, the percentage of Grade 4 students placing on grade level by median income group was 63%, 71%, and 78%, respectively. Each of those numbers decreased by spring 2022 to 50%, 59%, and 68%. The decreases across all three groups were somewhat similar (i.e., 10 to 13 percentage points), but because of their different baseline starting points, historical inequities in Grade 4 mathematics performance between the three groups persisted. For all three income-level groups, there was a 4- to 6-percentage-point improvement when comparing spring 2021 to spring 2022.

Table 7

Percentage of Students ⬆ **On Grade Level** by Income Group—Spring Testing Window: Mathematics, Grades 1–8

	Less Than $50,000			$50,000–$75,000			More Than $75,000		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	55%	43%	47%	64%	53%	56%	73%	63%	66%
2	53%	39%	44%	62%	51%	53%	71%	61%	63%
3	58%	42%	46%	66%	52%	55%	74%	63%	66%
4	63%	44%	50%	71%	55%	59%	78%	64%	68%
5	56%	44%	45%	65%	54%	55%	75%	65%	66%
6	48%	39%	41%	57%	48%	50%	67%	59%	60%
7	38%	32%	33%	48%	40%	41%	58%	51%	51%
8	33%	28%	29%	41%	35%	35%	51%	45%	45%

Graph 16

⬇ **Below Grade Level** by Median Household Income, Mathematics, Grade 4

Across all median income-level groups, there were more students placing below grade level in mathematics in spring 2022 than during the historical baseline. Prior to the pandemic, the percentage of Grade 4 students by median income level was 12%, 9%, and 6%, respectively. In spring 2022, those numbers had increased across all three groups to 19%, 13%, and 9%. The increase in the percentage of Grade 4 students needing support in mathematics, for schools with a median family income of less than $50,000, was more than twice that for families with a median income greater than $75,000.

Table 8

Percentage of Students ⬇ **Below Grade Level** by Income Group—Spring Testing Window: Mathematics, Grades 1–8

	Less Than $50,000			$50,000–$75,000			More Than $75,000		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	2%	5%	4%	1%	3%	3%	1%	2%	2%
2	7%	14%	13%	4%	9%	9%	3%	6%	6%
3	10%	17%	15%	7%	12%	11%	4%	8%	7%
4	12%	21%	19%	9%	14%	13%	6%	10%	9%
5	16%	23%	24%	11%	17%	18%	7%	11%	11%
6	21%	29%	30%	16%	24%	24%	10%	16%	16%
7	30%	38%	39%	23%	30%	31%	16%	22%	23%
8	40%	43%	44%	32%	37%	38%	24%	27%	28%

Limitations

The findings presented in this report are descriptive analyses. Descriptive data can be used to identify and discuss trends in the data, but it does not allow us to consider statistical significance or draw conclusions about the functional significance of the findings.

To describe grade-level performance over three time periods (i.e., historical spring, spring 2021, and spring 2022), we limited the analyses to only those schools and students who met our business rules (i.e., tested in school) in spring 2021 and spring 2022. In order to be included in these analyses, students had to self-report that they took the *i-Ready Diagnostic* in school. We acknowledge this is an imperfect measure. Ultimately, we chose to focus our findings on the in-school testing results in order to make a fairer comparison to the historical, pre-pandemic spring results. Even though we know the location of where students took the *i-Ready Diagnostic* based on self-reported data, we do not any have visibility into where students spent most of their time learning during the pandemic. Where a student took an assessment should not be conflated with where a student is learning (e.g., entirely in a traditional school building, entirely remote in their home or another location outside of their school building, or in multiple locations as part of a hybrid model).

The findings in this paper also rely on school-level demographics, which are not the same as student-level demographics. Schools consisting of more than 50% of one racial or ethnic group may still be fairly diverse, and we recognize that using school-level demographics does not capture that diversity nor the variability in unfinished learning within each school-level demographic group nor at the student-level demographic group. We were unable to have access to sufficient demographic data necessary to be able to report on disaggregated data for English Learners and students with disabilities—two student groups that are widely recognized to have had challenges with remote learning during the pandemic.

The sample used in these analyses is not a statistically representative national sample.

Discussion

As we report and reflect on the Diagnostic results from spring 2022, it is important to note that the pandemic arrived at a time when educational inequity was already worsening in America. NAEP results point to not only decades of inequity that predated the pandemic but also a widening achievement gap between higher- and lower-performing students during the decade before the pandemic (NAGB, 2022). Challenging assumptions, the National Assessment Governing Board (NAGB) notes that the nation's lowest-performing students before the pandemic cut across race, ethnicity, and parent educational backgrounds. Our own research found that students who were already below grade level on the Diagnostic before the pandemic suffered more than their on-grade level counterparts as growth rates slowed further (Dawson, 2022).

Given this context, any year-over-year improvements from 2021 to 2022, particularly among the students performing below grade level, is a testament to the extraordinary efforts made by students, educators, families, and communities. That students are reaching pre-pandemic levels in some grade levels and subjects today after multiple interrupted school years is nothing short of incredible.

Reaching pre-pandemic on-grade level averages is necessary but insufficient. We must keep our attention on students who are below grade level more now than ever, with an eye toward developing foundational reading and mathematics skills. We must also address the disproportionate impact our research shows the pandemic had on students of color and students from low-income backgrounds.

In a separate study, we re-examined the 2020–2021 school year data with the goal of better understanding schools that managed to exceed expectations in spite of the academic and economic challenges exacerbated by the pandemic (Pope & Leach, 2022). More than 300 schools with students two or more grade levels below grew substantially more than predicted from fall to spring after accounting for school-level characteristics. Leaders from a subset of these schools that served predominantly Black and Latino students were interviewed, and promising practices for supporting below-grade level students were identified. From home–school connections, prioritizing the needs of the whole student, and providing resources and supports to enhance teacher practice, these promising practices span familiar yet important areas that educators, policy makers, and families can focus on as we work together to restore the academic successes of our students.

Decades of education research have surfaced evidence-based best practices such as these that are effective in redressing unfinished learning. Academics and practitioners alike are currently calling for acceleration—not remediation—with several themes emerging such as intensive tutoring (Darling-Hammond & Edgerton, 2021; Barshay, 2021), summer learning and enrichment (US Department of Education, 2021; Bryant et al., 2022), and spending more time on grade-level work (TNTP, 2018; 2021; 2022). We offer our research insights here as a means to share what is working right now, with today's students, in schools and communities that were significantly impacted by the pandemic during one of the most challenging school years in American history.

Ultimately, we hope the findings in this report provide actionable information to assist educators in identifying student needs and in encouraging them to dive deeply into the reading and mathematics data of the students they serve. By having a clear understanding of the current state of student learning, policy makers and education leaders can act decisively to effectively address unfinished learning, with the goal of having students meet and exceed their grade-level expectations. We will continue to investigate the state of student learning and share out findings as more research is completed.

Conclusion

Results from the nearly two million students across the nation who took the Diagnostic and are included in this study underscore the urgent need to address unfinished learning. Students' reading and mathematics achievement from the two most recent school years continues to lag behind pre-pandemic performance. There are fewer students finishing the school year able to demonstrate on-grade level performance following the pandemic and more students needing support below their chronological grade level. Furthermore, the improvements that occurred between spring 2021 and spring 2022 were small and unevenly distributed across grades and subjects. Academic inequities that have long existed for students of color and students in lower-income communities before the pandemic persisted, and they were exacerbated by the condition of education during the pandemic.

In reading, performance in the early grades continues to be an area of deep concern. The pandemic has exacerbated the number of students needing support in Phonics. Data presented in the Appendices show that Grades K –1 students' performance in Phonological Awareness and High-Frequency Words was also impeded. When a student has unfinished learning in any domain, the student's proficiency in reading and gaining meaning from written text will be dramatically and negatively impacted (Gough & Tunmer, 1986; Foorman et al., 2016). Multiple reports substantiate that students who do not learn to read on grade level by Grade 3 will continue to need support throughout their lives (Miles & Stipek, 2006; National Research Council, 1998; US Department of Education, 1999). This cohort of our youngest students is at great risk for subsequent reading failure and the corresponding and wide-ranging negative impacts. This data should serve as a call to action to policy makers who have the means to impact the nation's attention and to education leaders who have the wherewithal to drive allocation of resources. Targeted, intensive, and effective interventions will be needed for all students needing support in foundational reading skills, whether they be in Grade K, upper-elementary school, or beyond.

While on-grade level middle schoolers are generally back to pre-pandemic levels in reading, this means that about half of students in Grades 6–8 are one or more grade levels below their chronological grade. In mathematics, the distance from the pre-pandemic historical averages is larger than what we see in reading, and it persists across all grades studied (i.e., Grades 1–8). And yet, there are bright spots within the data that we want to highlight. There is some year-over-year recovery in reading, even at the earlier grades. In spite of the setbacks in mathematics, this is also an area where the greatest rebounds are occurring as demonstrated by the improvements from spring 2021 to spring 2022. Digging into the disaggregated data shows some progress for historically marginalized students as well.

This report is intended to be the first of an annual series of reports on student learning. We will continue to examine and report on what we observe in our national dataset of student grade-level performance in reading and mathematics across elementary and middle school grades.

References

Bryant, J., Child, F., Dorn, E., Espinosa, J., Hall, S., Kola-Oyeneyin, T., Lim, C., Panier, F., Sarakatsannis, J., Schmautzer, D., Ungur, S., & Woord, B. (2022). *How COVID-19 caused a global learning crisis*. McKinsey & Company.

Curriculum Associates. (2018). *i-Ready assessments technical manual*. Author.

Curriculum Associates. (2020). *Understanding student needs: Early results from fall assessments*. Author.

Curriculum Associates. (2021a). *What we've learned about unfinished learning: Insights from midyear Diagnostic assessments*. Author.

Curriculum Associates. (2021b). *Academic achievement at the end of the 2020–2021 school year: Insights after more than a year of disrupted teaching and learning*. Author.

Curriculum Associates. (2021c). *Understanding student learning: Insights from fall 2021*. Author.

Curriculum Associates. (2021d). *i-Ready scale score placement tables (2021–2022 school year)*. Curriculum Associates Research Report No. 2021-15. Author.

Darling-Hammond, L. & Edgerton, A. K. (2021). *Accelerating learning as we build back better*. Learning Policy Institute.

Dawson, M. (2022). *Student growth during COVID-19: Grade-level readiness matters*. Curriculum Associates.

Foorman, B., Beyler, N., Borradaile, K., Coyne, M., Denton, C. A., Dimino, J., Furgeson, J., Hayes, L., Henke, J., Justice, L., Keating, B., Lewis, W., Sattar, S., Streke, A., Wagner, R., & Wissel, S. (2016). *Foundational skills to support reading for understanding in kindergarten through 3rd grade (NCEE 2016-4008)*. National Center for Education Evaluation and Regional Assistance (NCEE), Institute of Education Sciences, US Department of Education.

Goldhaber, D., Kane, T., McEachin, A., Morton E., Patterson, T., & Staiger, D. (2022). *The consequences of remote and hybrid instruction during the pandemic*. Center for Education Policy Research, Harvard University.

Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education, 7*(1), 6–10.

Lewis, K. & Kuhfeld, M. (2021). *Learning during COVID-19: An update on student achievement and growth at the start of the 2021–2022 school year*. NWEA Research.

Miles, S., & Stipek, D. (2006). Contemporaneous and longitudinal associations between social behavior and literacy achievement in a sample of low-income elementary school children. *Child Development, 77*(1), 103–117.

NAEP. (2019). *The nation's report card: Results from the 2019 Mathematics and Reading assessments*. National Assessment of Educational Progress.

NAGB. (2022). *NAEP trends: A decade of divergent scores and what they mean for 2022 NAEP results*.

National Research Council. (1998). Preventing reading difficulties in young children. In C. Snow, S. Burns, and P. Griffin (Eds.), *Committee on the Prevention of Reading Difficulties in Young Children*. National Academy Press.

NCES. (2019–2020). *Common core of data*. National Center for Education Statistics.

References, Cont'd.

NCTM. (n.d.). *Number and operations*. National Council of Teachers of Mathematics.

Office of Elementary and Secondary Education (OESE). (2020). ESSER I. *Elementary and Secondary School Emergency Relief Fund.*

OESE. (2021a). ESSER II. *Elementary and Secondary School Emergency Relief Fund.*

OESE. (2021b). ESSER III. *Elementary and Secondary School Emergency Relief Fund.*

Pope, A., & Leach, O. (2022). *Keys to unlocking success: Promising leadership practices of schools that exceeded expectations during the pandemic*. Curriculum Associates.

Samejima, F. (1977). A use of the information function in tailored testing. *Applied Psychological Measurement*, *1*(3), 233–247.

Siegler, R. S., Duncan G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., Susperreguy, M. I., & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science, 23*(7), 691–697.

Sireci, S. G., Thissen, D., & Wainer, H. (1991). On the reliability of testlet-based tests. *Journal of Educational Measurement, 28*(3), 237–247.

The New Teacher Project (TNTP). (2018). *The opportunity myth: What students can show us about how school is letting them down—and how to fix it.*

TNTP. (2021). *Accelerate, don't remediate: New evidence from elementary math classrooms.*

TNTP. (2022). *Unlocking acceleration: How below grade-level work is holding students back in literacy.*

US Department of Education. (1999). *Start early, finish strong: How to help every child become a reader.*

US Department of Education. (2021). *ED COVID-19 handbook: Roadmap to reopening safely and meeting all students' needs: Volume 2*.

Appendices

Assessment Measure

The *i-Ready Diagnostic* was developed to serve several purposes: Establish a metric that will allow for an accurate assessment of student knowledge that can be monitored over a period of time to gauge student improvement; Accurately assess student knowledge for different content strands within each subject; Provide information on what skills students are likely to have mastered and likely need to work on next; Link the assessment results to instructional advice (Curriculum Associates, 2018).

Upon completion of the Diagnostic, each student's results are reported as scale scores, placement levels, and norm-referenced percentile scores. *i-Ready Diagnostic* scale scores are linear transformations of logit values. For each assessment in reading and mathematics, an overall score is calculated, as are domain scores for each content strand. Scale scores can range in value from 100 to 800. In *i-Ready*, the placement is an on-grade level interpretation of the scale score (Curriculum Associates, 2018). When students' scale score is within the range for their grade level, their placement level is designated as Early On Grade Level, Mid On Grade Level, or Late On Grade Level. If their scale score is below or above the range for the grade level, the placement level is designated as Grade X (with X corresponding to the appropriate grade level). The scale score ranges that correspond to each placement level by subject, domain, and grade are listed in the *i-Ready* scale score placement tables (Curriculum Associates, 2021d).

The mean Standard Error of Measurement (SEM) for overall scores across grade levels is low in both the reading (i.e., 9.3–10.9) and mathematics (i.e., 6.3–6.5) assessments,, with many approaching the theoretical minimum SEM. The item response theory analogue to classical reliability estimation is called marginal reliability and operates on the variance of the theta scores and the mean of the expected error variance (Samejima, 1977; Sireci et al., 1991). This marginal reliability uses the classical definition of reliability as a proportion of variance in the total observed score due to true score. The true score variance is computed as the observed score variance minus the error variance. Like a classical reliability coefficient, the marginal reliability estimate increases as the SEM decreases. It approaches 1 when the SEM approaches 0. The estimated reliability for reading is .97, and the estimated reliability for mathematics is .96 (Curriculum Associates, 2018). The results from several linking studies support the strong external validity of *i-Ready Diagnostic*. The *i-Ready* scores correlated closely with Lexile® measures, Quantile® measures, and state assessments when the tests were taken within a short period of time, and results on the fall and winter *i-Ready* test correlations with spring state assessments also showed high correlations (most of .90 and higher).

School–Level Demographic Groups

To answer the research questions pertaining to race and ethnicity and median household income, we developed the following reporting groups based on available school-level demographics for the population of students who tested in school. Students were grouped based on whether their school:

- Served less than 25% Black students, 25%–50% Black students, or more than 50% Black students
- Served less than 25% Latino students, 25%–50% Latino students, or more than 50% Latino students
- Served less than 25% White students, 25%–50% White students, or more than 50% White students
- Was located in zip codes where the median household income is less than $50,000, ranges from $50,000–$75,000, or is more than $75,000

While the schools serving more than 50% Black, Latino, or White students may include varying levels of diversity, we chose to group schools this way to ensure we had a sufficient sample size for each school-level demographic group. The school-level data on race and ethnicity used in these analyses were sourced from the NCES, which asks students to identify as American Indian or Alaska Native, Asian, Black or African American, Hispanic, Native Hawaiian or Other Pacific Islander, White, or Two or More Races. Throughout this paper, we use the term "Black" to refer to the NCES category of Black or African American and the term "Latino" to refer to the NCES category of Hispanic. We recognize language changes with time, and each demographic group described is not monolithic, nor are all individuals within any designated demographic group in agreement on preferred language. As a company, we will continue to review, reflect on, and evolve the terminology with the goal of using bias-free, inclusive, and sensitive-language labels.

i-Ready Diagnostic Placement-Level Descriptors

Figure 1

i-Ready Diagnostic Placement-Level Descriptors

	Three or More Grade Levels Below	Two Grade Levels Below	One Grade Level Below	Early On Grade Level	Mid or Above Grade Level	
Placement relative to grade-level college- and career-readiness standards	Are not close to meeting			Only partially met	Met	
Instructional recommendations	**Likely need intensive intervention of foundational concepts.** Students who perform below grade level are not likely to be proficient on their state summative test, though it is possible.	**May need intensive intervention** of material that is **two grade levels below** to help fill in gaps in students' foundational knowledge.	**May benefit from review or remediation of material** that is **one grade level below**.	**Will benefit from on-grade level instruction** to help them meet the expectations of college- and career-readiness standards for their grade level.	**Mid On Grade Level**	Will benefit from instruction in late on-grade level topics.
					Late On Grade Level	Will benefit from late on-grade level enrichment and will be ready for instruction focused on topics typically covered in the beginning of the subsequent grade level.
					Above Grade Level	Will benefit from above-grade level instruction.

Sample Size by Demographic Variables

Table 1

Student Sample Size for School-Level Demographic Groups by Cohort, Reading and Mathematics

School-Level Demographic Group	Historical	'20–'21	'21–'22
Reading			
More Than 50% Black	276,744	113,473	142,243
More Than 50% Latino	484,141	187,305	247,411
More Than 50% White	1,566,414	730,644	836,963
Mathematics			
More Than 50% Black	261,239	107,076	136,258
More Than 50% Latino	483,936	197,757	261,476
More Than 50% White	1,872,318	887,752	1,022,923

Table 2

Student Sample Size for School-Level Median Family Income Groups by Cohort, Reading and Mathematics

School-Level Median Household Income	Historical	'20–'21	'21–'22
Reading			
Less Than $50,000	1,050,243	462,345	547,126
$50,000–$75,000	1,248,267	532,673	650,315
More Than $75,000	726,488	314,816	387,622
Mathematics			
Less Than $50,000	1,178,795	542,179	642,166
$50,000–$75,000	1,397,210	616,359	746,640
More Than $75,000	733,719	323,294	402,400

Median Scale Scores in Reading and Mathematics

Table 3

Median Scores by Cohort and Grade, Reading

Grade	Historical	’20–’21	’21–’22
1	460	444	449
2	510	498	500
3	538	532	534
4	560	556	560
5	580	578	578
6	591	589	590
7	605	601	602
8	617	615	615

Table 4

Median Scores by Cohort and Grade, Mathematics

Grade	Historical	’20–’21	’21–’22
1	410	402	405
2	436	427	429
3	460	449	452
4	480	467	471
5	491	482	482
6	499	492	494
7	504	498	498
8	508	503	502

Domain–Level Results in Reading and Mathematics

Table 5

Percentage of Students ⬆ **On Grade Level** by Cohort, Foundational Reading Domains

Domain and Grade Level	Historical	'20–'21	'21–'22
High-Frequency Words			
Grade K	78%	71%	70%
Grade 1	77%	67%	67%
Phonological Awareness			
Grade K	84%	81%	80%
Grade 1	72%	68%	69%

Table 6

Percentage of Students ⬇ **Below Grade Level** by Cohort, Foundational Reading Domains

Domain and Grade Level	Historical	'20–'21	'21–'22
High-Frequency Words			
Grade 1	3%	5%	6%
Phonological Awareness			
Grade 1	2%	4%	4%

Table 7

Percentage of Students ⬆ **On Grade Level** by Cohort, Phonics Domain

Grade	Historical	’20–’21	’21–’22
K	79%	74%	74%
1	68%	58%	59%
2	60%	52%	51%
3	74%	70%	67%
4	82%	79%	78%
5	88%	87%	85%
6	89%	89%	87%
7	91%	91%	89%
8	93%	93%	92%

Note: In the test flow of the *i-Ready Diagnostic* for Reading, students in Grades K–2 are automatically assessed in the Phonics domain. However, students in Grades 3–8 are assessed in Phonics only if their scale score in the Vocabulary and Comprehension domains is below a specific benchmark. In Phonics, the highest placement level that can be achieved is Grade 3. In Table 7, the percentages for students in Grades 4–8 represent the percentage of students in those grades who were assessed in Phonics who received the Max Score. The percentages for students in Grade 3 represent the percentage of students in Grade 3 who were assessed in Phonics and received a placement level of Early to Late Grade 3.

Table 8

Percentage of Students ⬇ **Below Grade Level** by Cohort, Phonics Domain

Grade	Historical	’20–’21	’21–’22
1	2%	4%	5%
2	12%	17%	19%
3	21%	24%	27%
4	16%	19%	20%
5	12%	13%	15%
6	11%	11%	13%
7	9%	9%	11%
8	7%	7%	8%

Note: In the test flow of the *i-Ready Diagnostic* for Reading, students in Grades K–2 are automatically assessed in the Phonics domain. However, students in Grades 3–8 are assessed in Phonics only if their scale score in the Vocabulary and Comprehension domains is below a specific benchmark. In Phonics, the highest placement level that can be achieved is Grade 3. In Table 8, the percentages for students in Grades 5–8 represent the percentage of students in those grades who were assessed in Phonics who received a placement level of Grade 3 or lower. The percentages for students in Grade 3 represent the percentage of students in Grade 3 who were assessed in Phonics and received a placement level of Grade 1 or lower. The percentages for students in Grade 4 represent the percentage of students in Grade 4 who were assessed in Phonics and received a placement level of Grade 2 or lower.

Table 9

Percentage of Students ⓘ **On Grade Level** by Cohort, Vocabulary and Comprehension Domains

Domain and Grade Level	Historical	'20–'21	'21–'22
Vocabulary			
Grade K	77%	75%	72%
Grade 1	59%	52%	52%
Grade 2	57%	52%	51%
Grade 3	64%	62%	60%
Grade 4	48%	49%	49%
Grade 5	44%	44%	43%
Grade 6	44%	42%	40%
Grade 7	47%	44%	43%
Grade 8	49%	47%	45%
Comprehension: Literature			
Grade K	85%	83%	80%
Grade 1	64%	56%	56%
Grade 2	63%	55%	53%
Grade 3	67%	62%	60%
Grade 4	57%	54%	54%
Grade 5	53%	53%	51%
Grade 6	45%	45%	43%
Grade 7	44%	45%	42%
Grade 8	43%	46%	42%
Comprehension: Informational Text			
Grade K	83%	81%	78%
Grade 1	63%	55%	55%
Grade 2	62%	52%	51%
Grade 3	64%	59%	57%
Grade 4	50%	47%	47%
Grade 5	47%	47%	45%
Grade 6	42%	42%	40%
Grade 7	42%	42%	40%
Grade 8	41%	44%	41%

Table 10

Percentage of Students ⓘ **Below Grade Level** by Cohort, Vocabulary and Comprehension Domains

Domain and Grade Level	Historical	'20–'21	'21–'22
Vocabulary			
Grade 1	3%	5%	6%
Grade 2	10%	13%	15%
Grade 3	16%	18%	21%
Grade 4	15%	17%	18%
Grade 5	26%	25%	28%
Grade 6	33%	33%	35%
Grade 7	35%	36%	38%
Grade 8	34%	35%	37%
Comprehension: Literature			
Grade 1	2%	3%	4%
Grade 2	9%	13%	15%
Grade 3	16%	21%	23%
Grade 4	16%	19%	20%
Grade 5	24%	25%	28%
Grade 6	32%	31%	34%
Grade 7	39%	38%	41%
Grade 8	39%	36%	40%
Comprehension: Informational Text			
Grade 1	3%	4%	5%
Grade 2	10%	14%	16%
Grade 3	18%	22%	24%
Grade 4	19%	22%	23%
Grade 5	30%	30%	33%
Grade 6	39%	38%	40%
Grade 7	43%	41%	44%
Grade 8	43%	39%	42%

Table 11

Percentage of Students ⓘ **On Grade Level** by Cohort, Mathematics Domains

Domain and Grade Level	Historical	'20–'21	'21–'22
Algebra and Algebraic Thinking			
Grade K	71%	66%	66%
Grade 1	73%	64%	64%
Grade 2	62%	52%	54%
Grade 3	69%	59%	59%
Grade 4	70%	58%	57%
Grade 5	55%	48%	46%
Grade 6	53%	47%	45%
Grade 7	43%	37%	35%
Grade 8	38%	35%	32%
Geometry			
Grade K	81%	74%	67%
Grade 1	64%	58%	52%
Grade 2	64%	54%	51%
Grade 3	55%	46%	44%
Grade 4	60%	46%	47%
Grade 5	58%	51%	46%
Grade 6	50%	44%	42%
Grade 7	41%	36%	33%
Grade 8	38%	34%	32%
Measurement and Data			
Grade K	75%	69%	64%
Grade 1	61%	52%	52%
Grade 2	62%	53%	54%
Grade 3	65%	55%	55%
Grade 4	67%	55%	54%
Grade 5	67%	58%	55%
Grade 6	58%	52%	48%
Grade 7	51%	47%	44%
Grade 8	44%	44%	41%

Table 12

Percentage of Students ⬇ **Below Grade Level** by Cohort, Mathematics Domains

Domain and Grade Level	Historical	'20–'21	'21–'22
Algebra and Algebraic Thinking			
Grade 1	2%	5%	5%
Grade 2	4%	7%	8%
Grade 3	7%	12%	13%
Grade 4	11%	16%	18%
Grade 5	13%	17%	21%
Grade 6	21%	25%	28%
Grade 7	30%	35%	38%
Grade 8	37%	40%	44%
Geometry			
Grade 1	3%	5%	6%
Grade 2	9%	14%	15%
Grade 3	9%	13%	14%
Grade 4	16%	22%	23%
Grade 5	18%	21%	26%
Grade 6	23%	27%	33%
Grade 7	32%	34%	41%
Grade 8	38%	38%	44%
Measurement and Data			
Grade 1	4%	6%	7%
Grade 2	8%	12%	13%
Grade 3	11%	15%	17%
Grade 4	13%	18%	21%
Grade 5	15%	18%	22%
Grade 6	19%	23%	27%
Grade 7	26%	30%	34%
Grade 8	32%	34%	38%

Additional Results

Table 13

Percentage of Students ⓘ **On Grade Level** in Reading by Demographic Group—Spring

	Less Than 25% Black			Less Than 25% Latino			Less Than 25% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	70%	59%	62%	70%	59%	62%	57%	43%	47%
2	70%	60%	61%	70%	59%	61%	55%	41%	43%
3	75%	70%	70%	75%	70%	70%	61%	52%	54%
4	57%	54%	56%	56%	53%	56%	40%	34%	40%
5	53%	51%	52%	52%	51%	51%	38%	35%	36%
6	49%	46%	47%	49%	46%	47%	32%	29%	33%
7	51%	47%	48%	51%	47%	47%	32%	30%	34%
8	51%	49%	49%	50%	47%	47%	35%	33%	35%
	25%–50% Black			25%–50% Latino			25%–50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	61%	48%	51%	66%	54%	57%	68%	56%	60%
2	61%	48%	50%	65%	54%	55%	68%	56%	58%
3	66%	58%	59%	72%	64%	66%	73%	66%	67%
4	44%	38%	43%	52%	48%	51%	54%	49%	53%
5	40%	38%	38%	47%	44%	45%	48%	46%	47%
6	35%	33%	35%	41%	38%	40%	42%	39%	39%
7	36%	33%	34%	42%	40%	41%	41%	37%	39%
8	37%	36%	36%	43%	43%	43%	43%	40%	41%

Table 14

Percentage of Students ⬇ **Below Grade Level** in Reading by Demographic Group—Spring

	Less Than 25% Black			Less Than 25% Latino			Less Than 25% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	1%	2%	2%	1%	2%	2%	2%	4%	4%
2	6%	9%	10%	5%	9%	9%	12%	20%	20%
3	11%	15%	16%	10%	15%	15%	18%	28%	27%
4	11%	14%	14%	11%	14%	14%	19%	28%	24%
5	21%	23%	23%	21%	24%	23%	33%	38%	37%
6	29%	31%	30%	29%	31%	30%	46%	48%	44%
7	32%	34%	34%	32%	35%	34%	52%	53%	49%
8	32%	32%	33%	33%	34%	34%	48%	49%	47%
	25%–50% Black			25%–50% Latino			25%–50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	2%	3%	3%	1%	3%	3%	1%	2%	2%
2	8%	15%	15%	7%	13%	13%	6%	11%	11%
3	15%	23%	23%	12%	19%	18%	11%	18%	17%
4	16%	24%	21%	13%	19%	16%	12%	17%	15%
5	30%	34%	34%	25%	28%	28%	24%	27%	27%
6	42%	44%	41%	36%	39%	37%	35%	39%	38%
7	47%	50%	49%	41%	42%	41%	42%	45%	43%
8	46%	46%	46%	39%	38%	39%	40%	41%	40%

Table 15

Percentage of Students ⓘ **On Grade Level** in Mathematics by Demographic Group—Spring

	Less Than 25% Black			Less Than 25% Latino			Less Than 25% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	66%	55%	58%	66%	55%	59%	51%	36%	41%
2	64%	52%	55%	64%	53%	56%	49%	33%	38%
3	67%	54%	57%	67%	55%	58%	55%	35%	42%
4	71%	56%	61%	71%	57%	61%	61%	39%	46%
5	66%	55%	56%	67%	56%	57%	53%	40%	41%
6	59%	50%	52%	60%	50%	52%	39%	30%	34%
7	50%	42%	43%	50%	42%	43%	29%	25%	28%
8	43%	37%	37%	44%	37%	37%	23%	22%	23%
	25%–50% Black			25%–50% Latino			25%–50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	55%	42%	46%	59%	47%	51%	62%	49%	53%
2	53%	39%	43%	58%	45%	48%	59%	46%	50%
3	58%	41%	46%	63%	46%	51%	64%	48%	53%
4	63%	44%	50%	68%	49%	55%	68%	51%	56%
5	55%	43%	43%	61%	49%	49%	61%	49%	50%
6	46%	37%	40%	49%	39%	42%	51%	42%	44%
7	32%	27%	27%	37%	31%	32%	39%	33%	33%
8	28%	24%	23%	32%	27%	28%	33%	28%	28%

Table 16

Percentage of Students **Below Grade Level** in Mathematics by Demographic Group—Spring

	Less Than 25% Black			Less Than 25% Latino			Less Than 25% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	1%	3%	3%	1%	3%	3%	2%	7%	6%
2	4%	9%	9%	4%	8%	8%	8%	18%	17%
3	7%	11%	10%	6%	11%	10%	11%	22%	18%
4	9%	14%	13%	8%	13%	12%	14%	25%	22%
5	11%	16%	17%	11%	16%	16%	18%	27%	28%
6	15%	22%	22%	14%	22%	22%	28%	39%	37%
7	21%	28%	29%	21%	29%	30%	39%	48%	46%
8	30%	34%	35%	29%	34%	35%	51%	53%	52%
	25%–50% Black			25%–50% Latino			25%–50% White		
Grade	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**	**Historical**	**'20–'21**	**'21–'22**
1	2%	5%	5%	2%	5%	4%	1%	4%	4%
2	7%	14%	13%	6%	12%	11%	5%	11%	10%
3	9%	17%	15%	8%	15%	13%	8%	14%	12%
4	12%	21%	19%	10%	18%	16%	10%	17%	15%
5	16%	24%	25%	13%	20%	21%	13%	20%	20%
6	23%	32%	32%	22%	31%	31%	20%	29%	29%
7	35%	44%	46%	32%	39%	41%	30%	38%	39%
8	46%	48%	50%	42%	45%	45%	39%	44%	45%

Curriculum Associates®

Curriculum Associates, the creator of *i-Ready*, has been united around one common purpose: to make classrooms better places for teachers and students. For more than 50 years, we've remained driven by this mission, introducing and then constantly improving innovative and exciting products that give every student the chance to succeed.

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