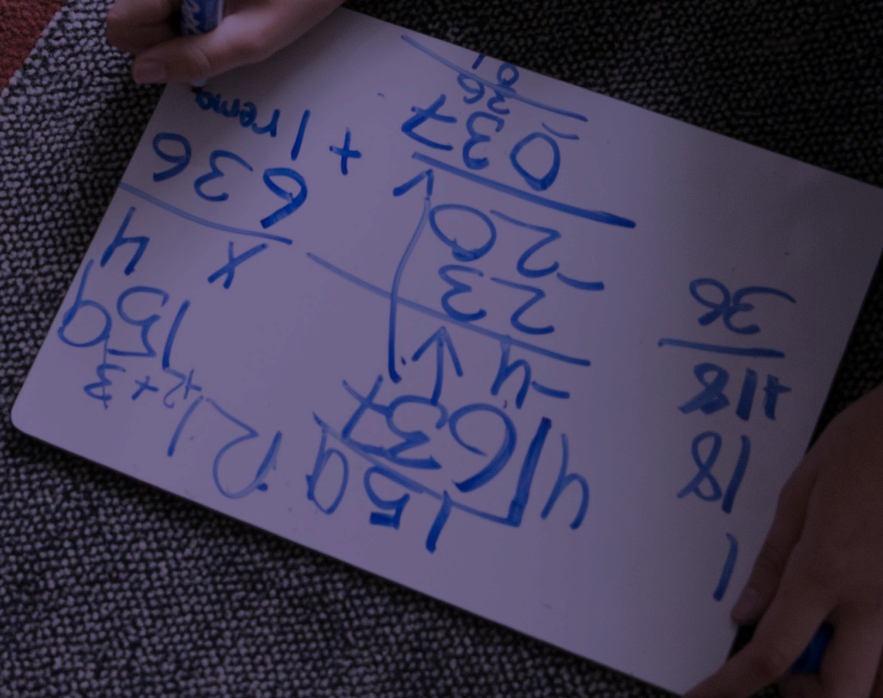


## COVID-19 in the early elementary years: A comparison of achievement in spring 2019 and spring 2022

OCTOBER 2022

Megan Kuhfeld and Karyn Lewis





## KEY FINDINGS

- First- and second-grade student achievement at the end of 2021–22 was lower compared to prepandemic trends in reading (6 to 7 percentile points) and math (3 to 8 percentile points).
- Black, Hispanic, and American Indian/Alaska Native (AIAN) students and students in high-poverty schools were disproportionately impacted.
- Second-graders made gains in math and reading during 2021–22 that were consistent with prepandemic trends; however, first-graders grew less than a typical year by 6-7%.

While the ongoing impact of the pandemic in grades 3–8 has been well documented (Betthäuser et al., 2022; Kuhfeld & Lewis, 2022a), far less is known about its effects on students who were in pre-K or kindergarten when the pandemic started in March 2020. In this brief, we focus on students who were in first and second grade in the 2021–22 school year.<sup>1</sup> Studying these students may offer important additional insights into how the pandemic has shaped schooling experiences, as the majority of school experiences for these grades have occurred *since the onset of the pandemic*. Students who were in second grade in the 2021–22 school year had at most six months of “typical” in-person learning before the COVID-19 pandemic disrupted their schooling, and the first graders in 2021–22 have only known pandemic schooling. Preliminary evidence from earlier in the 2021–22 school year shows that an increasing number of K–2 students were at risk for persistent reading difficulties (Amplify, 2022; Solari, 2022), but we have little data on students’ early math skills or data on how achievement at the end of the 2021–22 school year compares to prepandemic levels.

To understand how the youngest learners have fared since the onset of the pandemic, we used test-score data from 1.6 million students in grades 1–2 who took MAP® Growth™ assessments in reading and math in approximately 11,000 public schools in 2021–22 and compared these data to a roughly equivalent sample of students who tested in those same grades in 2018–19. Descriptions of the pre-COVID and COVID samples of students/schools included in this study are provided in Tables 1 and 2. We followed the same methodological approaches documented in a [technical report](#) that accompanies a prior NWEA® [research report](#) (Kuhfeld & Lewis, 2022b).

### Spring 2022 math and reading achievement in the early grades lags historical averages

We quantified the achievement gap between pre-COVID and COVID test performance by examining differences in end-of-year achievement percentiles. We calculated the median percentile rank (based on [NWEA 2020 MAP Growth norms](#)) of students in spring 2022 (COVID sample) and spring 2019 (pre-COVID sample), as well as the difference in median percentile rank between these two groups. As shown in Figure 1, we observed lower spring 2022 achievement relative to spring 2019 for first- and second-grade students, with the differences ranging in magnitude from 6 to 7 percentile points in reading and 3 to 8 percentile points in math.<sup>2</sup> Table 3 provides the median percentile for each grade/subject/term, as well as sample sizes, means, and standard deviations.

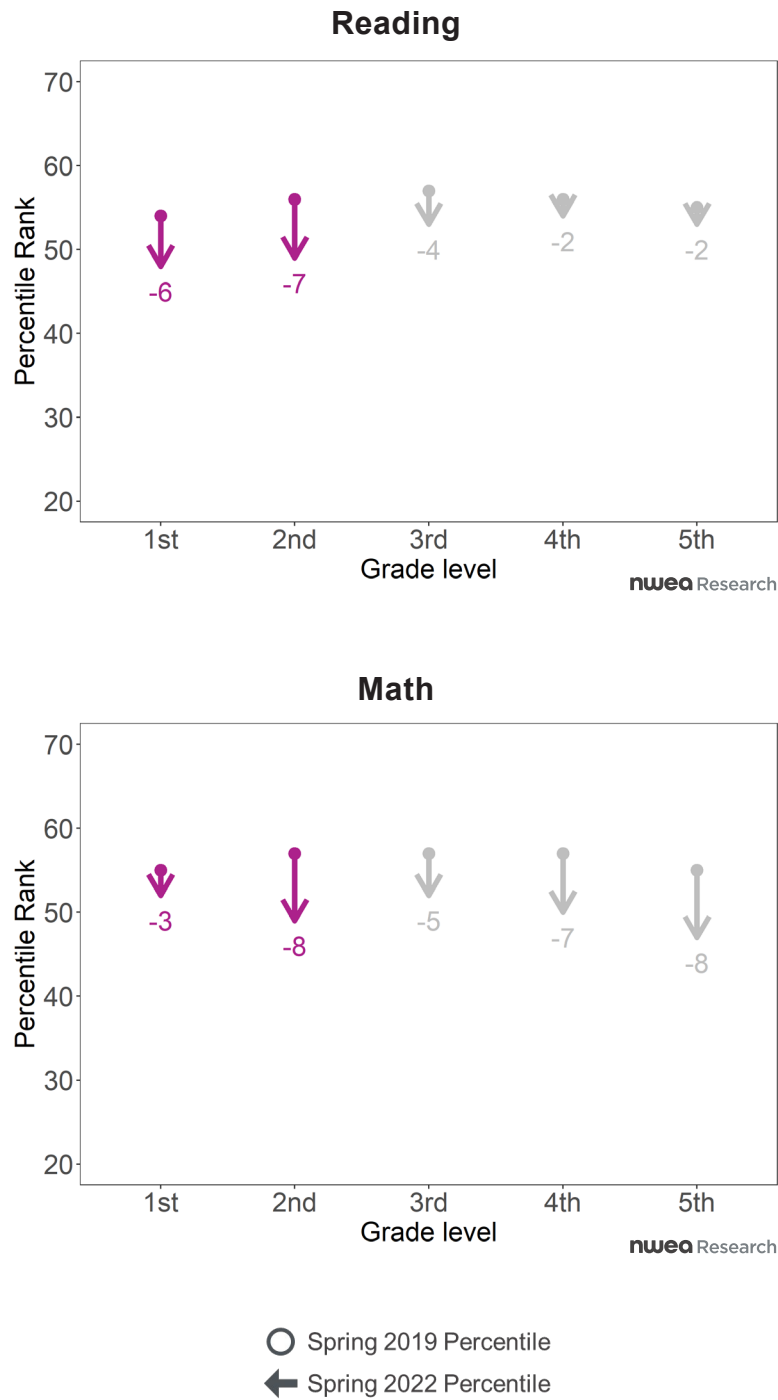
### Historically marginalized and economically disadvantaged students have lost more ground in math and reading compared to advantaged peers

Figure 2 shows percentile rank changes from 2019 to 2022 disaggregated by student race/ethnicity. This allows us, for example, to compare the achievement of Asian American students in spring of 2022 to the achievement of Asian American same-grade students in the spring of 2019. Figure 2 shows that all student groups were impacted in reading and math. However, consistent with our findings for students in grades 3–5, the magnitudes of these differences for the younger students were uneven across student groups. In both subjects, the differences in achievement between the pre-COVID and COVID samples is smaller for Asian American and White students than for Hispanic, Black, and American Indian and Alaska Native (AIAN) students.

<sup>1</sup> We did not include students who were in kindergarten in the 2021–22 school year because the composition of kindergarten students tested in 2021–22 was substantially different compared to prepandemic samples. This is consistent with enrollment declines in kindergarten reported across many districts during the pandemic (Dee et al., 2021).

<sup>2</sup> Figure 1 also displays the results for grades 3–5 from the [July 2022 COVID report](#) as a point of comparison (Kuhfeld & Lewis, 2022a).

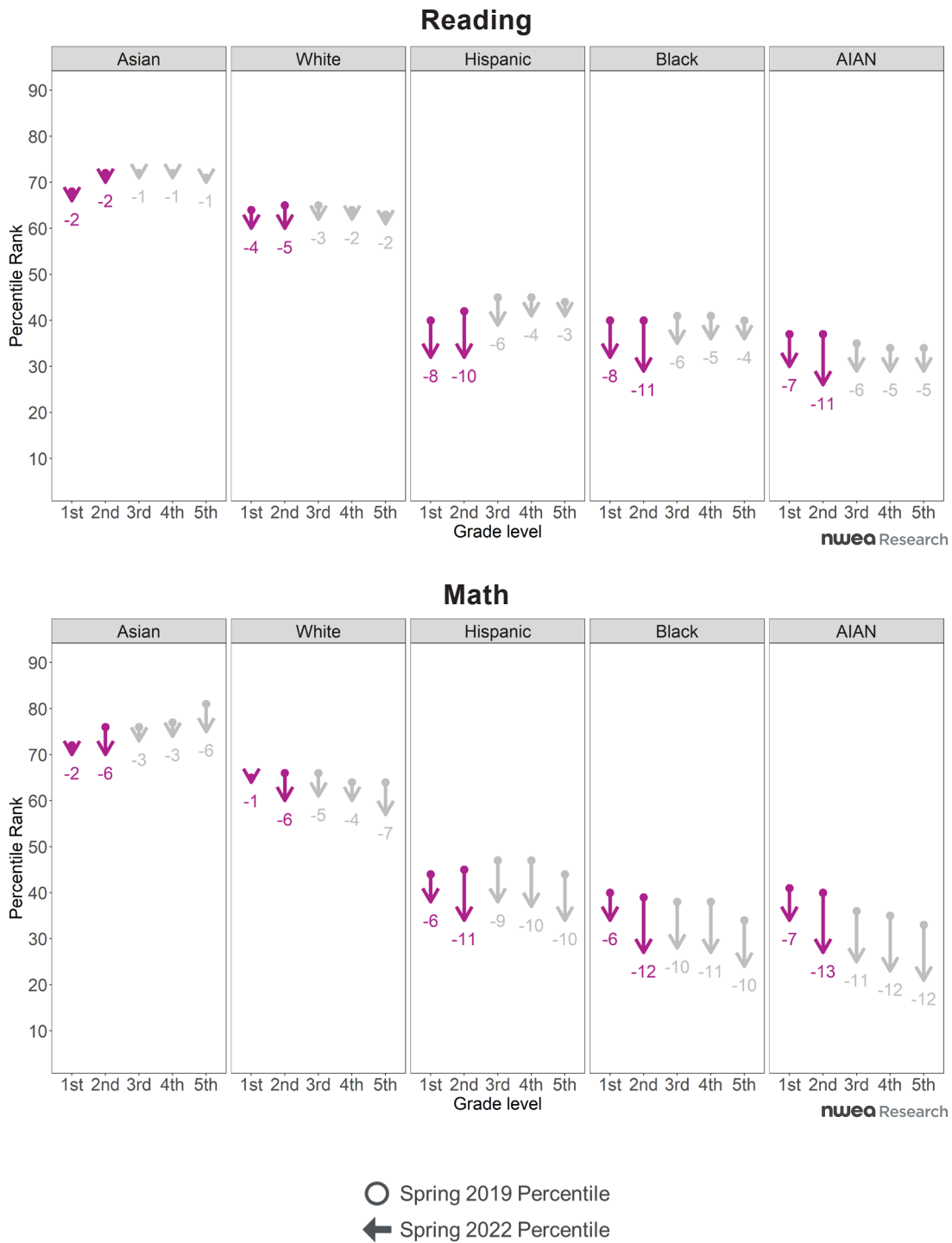
Figure 1. MAP Growth percentile rank differences between same-grade students in spring 2019 (circles) and students in spring 2022 (arrows) in reading (top panel) and math (bottom panel)



Note. The circles represent the median percentile rank for the pre-COVID (spring 2019) sample; the arrow tips represent the median percentile rank for the COVID (spring 2022) sample; and the values outside the arrows indicate the difference in median percentile rank between spring 2019 and spring 2022.

2 Figure 1 also displays the results for grades 3-5 from the July 2022 COVID report as a point of comparison (Kuhfeld & Lewis, 2022a).

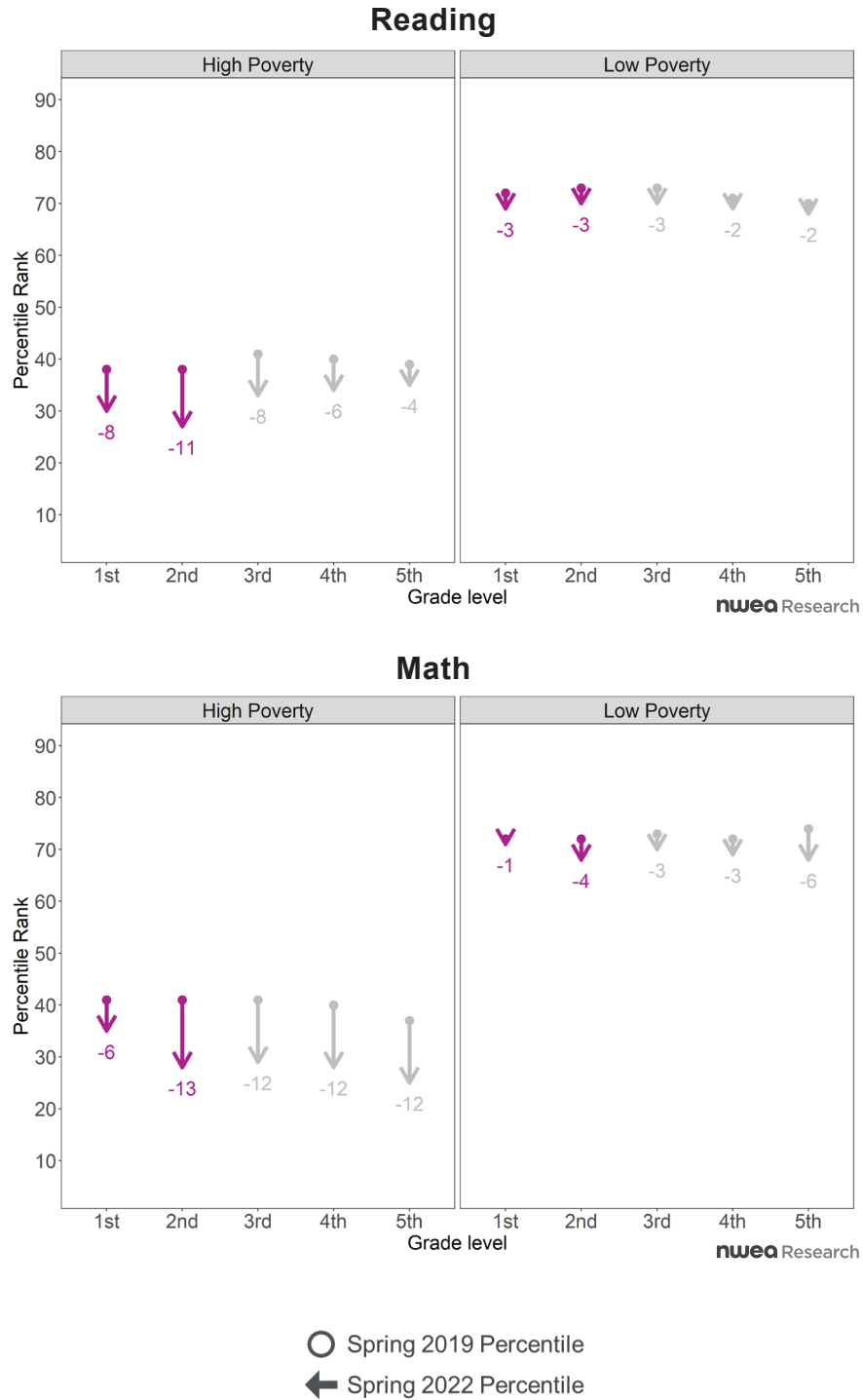
Figure 2. MAP Growth percentile rank change by race/ethnicity in reading (top panel) and math (bottom panel)



Note. AIAN = American Indian or Alaska Native. The circles represent the median percentile rank for the pre-COVID (spring 2019) sample; the arrow tips represent the median percentile rank for the COVID (spring 2022) sample; and the values outside the arrows indicate the difference in median percentile rank between spring 2019 and spring 2022.

Figure 3 shows percentile rank changes disaggregated by school poverty level. “Low poverty” is defined as less than 25% free or reduced-price lunch (FRPL) eligibility, while “high poverty” is greater than 75% FRPL eligibility. In both subjects, the differences in achievement between the pre-COVID and COVID samples are larger for students in high-poverty schools than for students in low-poverty schools.

Figure 3. MAP Growth percentile rank change by school poverty level in reading (top panel) and math (lower panel)



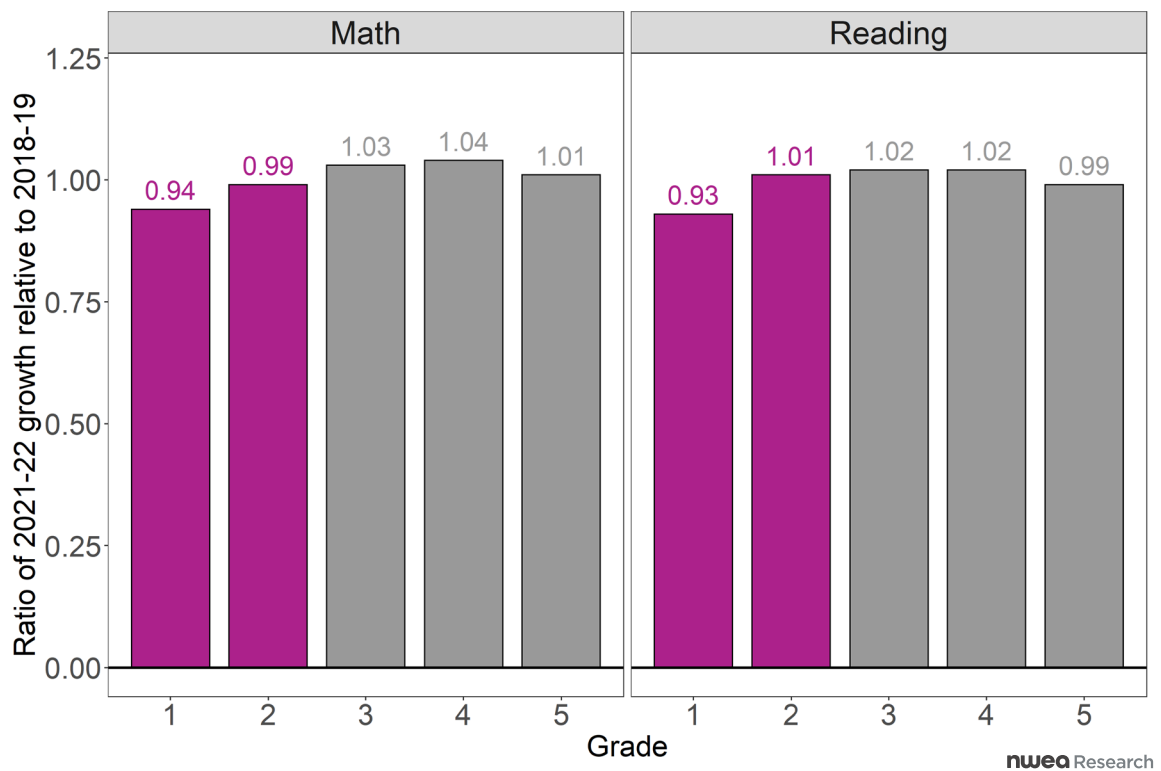
Note. “Low poverty” is defined as less than 25% free or reduced-price lunch (FRPL) eligibility, while “high poverty” is greater than 75% FRPL eligibility. The circles represent the median percentile rank for the pre-COVID (spring 2019) sample; the arrow tips represent the median percentile rank for the COVID (spring 2022) sample; and the values outside the arrows indicate the difference in median percentile rank between spring 2019 and spring 2022.

### School year achievement gains for first graders in 2021-22 lagged prepandemic trends

Figure 4 compares students' fall-spring achievement gains during the 2021-22 school year with the average achievement gains for first- and second-graders in the 2018-19 school year (also see Table 4 for the achievement gains reported in RIT points). While we previously observed that the achievement gains for students in grades 3-5 in 2021-22 closely paralleled (and

in some cases slightly exceeded) average prepandemic achievement gains (Kuhfeld & Lewis, 2022), first graders in 2021-22 grew less in both math and reading than a typical year, by 6-7%. That is to say, first graders are continuing to fall further behind relative to the achievement levels observed prior to the pandemic. Second graders, on the other hand, showed growth in both subjects that paralleled prepandemic achievement gains.

Figure 4. Ratio of average fall-spring achievement gains in 2021-22 and fall-spring gains in 2018-19 by grade and subject



Note. The ratios are calculated by dividing the average fall-spring gain scores for a grade/subject in the 2021-22 school year by the average fall-spring gain scores for the pre-COVID sample (the 2018-19 school year). See Table 4 for the growth estimates used in the calculations. The grade 3-5 estimates are reported in the July 2022 [technical appendix](#).

## Summary

This brief provides further evidence of the challenges that young learners are currently facing from the disruptions of the COVID-19 pandemic. Reading and math achievement in first and second grade remains substantially lower in spring 2022 relative to historical data. The largest differences were observed for historically marginalized and economically disadvantaged students, and the sizable pre-existing disparities along these dimensions widened significantly during the pandemic. While second-grade to fifth-grade students showed mostly parallel growth trends in 2021-22 relative to a prepandemic year, students in first grade, who have only experienced pandemic schooling, showed 6-7% lower growth. Taken together, our findings demonstrate that the impact of the pandemic is not limited to the students for whom “normal” was turned on its head following the onset of COVID-19. Even students who have only ever known schooling during the pandemic era have been impacted. These results highlight the need for targeted investments in early literacy and math programs to ensure that our youngest students can develop these essential skills.

## References

- i. Amplify. (2022, February). Amid academic recovery in classrooms nationwide, risks remain for youngest students with least instructional time during critical early years. [https://amplify.com/wp-content/uploads/2022/02/mCLASS\\_MOY-Results\\_February-2022-Report.pdf](https://amplify.com/wp-content/uploads/2022/02/mCLASS_MOY-Results_February-2022-Report.pdf)
- ii. Betthäuser, B. A., Bach-Mortensen, A., & Engzell, P. (2022). A systematic review and meta-analysis of the impact of the COVID-19 pandemic on learning. <https://doi.org/10.35542/osf.io/d9m4h>
- iii. Dee, T. S., Huffaker, E., Philips, C., & Sagara, E. (2021). The revealed preferences for school reopening: Evidence from public-school disenrollment (CEPA Working Paper No. 21.06). Stanford Center for Education Policy Analysis. <https://cepa.stanford.edu/wp21-06>
- iv. Kuhfeld, M., & Lewis, K. (2022a). Student achievement in 2021-22: Cause for hope and continued urgency. NWEA. <https://www.nwea.org/research/publication/student-achievement-in-2021-22-cause-for-hope-and-continued-urgency>
- v. Kuhfeld, M. & Lewis, K. (2022b). Technical appendix for: Student achievement in 2021-22: Cause for hope and continued urgency. NWEA. <https://www.nwea.org/content/uploads/2022/06/Technical-appendix-for-Student-achievement-in-2021-22-Cause-for-hope-and-continued-urgency.pdf>
- vi. Solari, E. (2022). Examining the impact of COVID-19 on the identification of at-risk students: Fall 2021 literacy screening findings. University of Virginia. [https://literacy.virginia.edu/sites/g/files/jsddwu1006/files/2022-04/PALS\\_StateReport\\_Fall\\_2021.pdf](https://literacy.virginia.edu/sites/g/files/jsddwu1006/files/2022-04/PALS_StateReport_Fall_2021.pdf)
- vii. Thum, Y. M., & Kuhfeld, M. (2020). NWEA 2020 MAP Growth achievement status and growth norms for students and schools. NWEA Research Report. Portland, OR: NWEA. <https://teach.mapnwea.org/impl/normsResearchStudy.pdf>
- viii. U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "State nonfiscal survey of public elementary and secondary education," 2009–10 and 2018–19. See Digest of Education Statistics 2020, table 203.50



**Table 1***Description of the Pre-COVID and COVID Student Samples*

Grade	Sample	N Students	N Schools	Male	Female	White	Black	Hispanic	Asian	AIAN	Multi-racial
Full sample (across grades and subjects)											
—	Pre-COVID	1,671,464	13,178	0.51	0.49	0.46	0.18	0.20	0.04	0.01	0.04
—	COVID	1,559,102	11,581	0.51	0.49	0.45	0.16	0.22	0.04	0.01	0.05
Reading											
1	Pre-COVID	712,143	10,934	0.51	0.49	0.47	0.18	0.18	0.04	0.02	0.04
2	Pre-COVID	853,047	13,024	0.51	0.49	0.47	0.18	0.19	0.04	0.01	0.04
1	COVID	651,868	9,617	0.51	0.49	0.46	0.17	0.21	0.04	0.01	0.05
2	COVID	760,455	11,009	0.51	0.49	0.47	0.16	0.21	0.04	0.01	0.05
Math											
1	Pre-COVID	756,660	11,279	0.51	0.49	0.46	0.18	0.19	0.04	0.02	0.04
2	Pre-COVID	875,686	13,113	0.51	0.49	0.47	0.18	0.20	0.04	0.01	0.04
1	COVID	715,470	10,293	0.51	0.49	0.45	0.17	0.22	0.04	0.01	0.05
2	COVID	805,122	11,465	0.51	0.49	0.46	0.16	0.22	0.05	0.01	0.05

*Note.* AIAN = American Indian or Alaska Native. The pre-COVID sample represents students testing in spring 2019, while the COVID sample represents students testing in spring 2022. Many students tested in both math and reading, which is why the unique count of students for each sample (top two rows) is not a sum of the sample sizes reported in the table. As a point of comparison, the projected percentage distribution of students enrolled in public elementary and secondary schools in the 2021–22 school year was 46% White, 15% Black, 28% Hispanic/Latino, 6% Asian, 1% AIAN, and 4% other race. (US Department of Education).

**Table 2***Sample School Information Relative to US Population of Schools*

	Number of schools	Average school enrollment	% FRPL	% White	% Black	% Hispanic	% Asian American	City	Rural	Suburb	Town
Pre-COVID	13,178	448	0.56	0.50	0.18	0.21	0.04	0.30	0.34	0.26	0.10
COVID	11,581	461	0.56	0.51	0.16	0.23	0.03	0.30	0.33	0.28	0.10
US public schools	54,612	451	0.56	0.48	0.15	0.26	0.04	0.30	0.33	0.26	0.10

*Note:* FRPL = free or reduced-price lunch. The NWEA pre-COVID sample is defined as schools that administered MAP Growth in first or second grade in spring 2019, while the NWEA COVID sample is defined as schools that administered MAP Growth in first or second grade in spring 2022. The source of the variables is the Common Core of Data (CCD), collected by the National Center for Educational Statistics. The US public school population comparison for each grade was determined by limiting to the schools that were operational in 2019–20 and enrolled students in either first or second grade.

**Table 3***Student RIT Score Means and Standardized Difference by Grade, Subject, and Term*

Subject	Grade	Group	Pre-COVID (spring 2019)			COVID (spring 2022)			Standardized difference between samples		
			N	Mean	SD	Median		Median perc.			
						N	Mean			SD	
All students											
Reading	1	All	712,143	172.27	14.45	54	651,868	170.05	15.37	48	-0.15
Reading	2	All	853,047	186.53	16.01	56	760,455	183.72	17.39	49	-0.17
Math	1	All	756,660	177.75	13.90	55	715,470	176.05	14.72	52	-0.12
Math	2	All	875,686	190.61	13.98	57	805,122	187.41	15.18	49	-0.22
Race/ethnicity											
Reading	1	White	334,977	175.72	13.58	64	299,223	174.10	14.07	60	-0.12
Reading	1	Black	130,130	167.40	13.81	40	110,796	164.64	14.71	32	-0.19
Reading	1	Hispanic	129,817	167.29	14.17	40	134,273	164.20	15.21	32	-0.21
Reading	1	Asian	29,655	176.72	15.43	68	26,487	175.82	16.84	66	0.06
Reading	1	AIAN	11,382	166.70	14.18	37	7,885	164.27	15.31	30	-0.17
Reading	2	White	399,331	190.10	15.16	65	354,582	187.99	16.24	60	-0.14
Reading	2	Black	153,494	180.94	15.43	40	123,995	176.86	16.73	29	0.25
Reading	2	Hispanic	161,791	181.47	15.68	42	156,145	177.72	16.90	32	-0.23
Reading	2	Asian	36,340	192.69	15.93	72	33,790	191.24	17.33	70	-0.09
Reading	2	AIAN	12,232	179.92	15.65	37	8,845	175.87	17.14	26	0.25
Math	1	White	349,042	181.02	12.91	65	320,490	180.08	13.29	64	-0.07
Math	1	Black	137,604	172.42	13.44	40	118,560	169.64	14.31	34	-0.20
Math	1	Hispanic	146,564	173.60	13.55	44	158,990	171.20	14.34	38	-0.17
Math	1	Asian	33,453	183.86	15.19	72	30,987	182.84	16.28	70	-0.06
Math	1	AIAN	11,554	173.03	13.68	41	8,170	170.80	14.86	34	-0.16
Math	2	White	407,635	193.78	12.83	66	366,903	191.48	13.58	60	-0.17
Math	2	Black	154,263	184.70	13.86	39	130,070	179.86	15.08	27	-0.34
Math	2	Hispanic	170,871	186.70	13.75	45	174,927	182.76	14.71	34	-0.28
Math	2	Asian	39,159	197.77	14.34	76	37,021	195.21	15.77	70	-0.17
Math	2	AIAN	11,995	185.48	14.10	40	9,240	180.88	15.65	27	-0.31
School poverty											
Reading	1	High poverty	195,727	166.76	13.95	38	166,934	163.51	14.86	30	-0.23
Reading	1	Low poverty	126,206	178.76	13.40	72	111,680	177.46	13.96	69	-0.10
Reading	2	High poverty	228,275	180.28	15.66	38	185,214	175.87	16.76	27	-0.27
Reading	2	Low poverty	170,345	193.88	14.43	73	149,137	192.12	15.45	70	-0.12
Math	1	High poverty	207,407	172.67	13.60	41	187,121	170.00	14.49	35	-0.19
Math	1	Low poverty	134,410	183.89	12.98	72	125,801	183.05	13.34	71	-0.06
Math	2	High poverty	230,872	185.21	14.03	41	200,923	180.56	15.17	28	-0.32
Math	2	Low poverty	175,428	196.56	12.37	72	157,906	194.73	13.03	68	-0.14

**Table 3 Continued***Student RIT Score Means and Standardized Difference by Grade, Subject, and Term*

Subject	Grade	Group	Pre-COVID (spring 2019)			COVID (spring 2022)					Standardized difference between samples	
			N	Mean	SD	Median		N	Mean	SD		Median perc.
						perc.	Urbanicity					
Reading	1	City	203,683	170.45	15.03	48	173,546	167.68	16.22	42	-0.18	
Reading	1	Rural	140,964	173.64	13.44	57	128,841	171.50	13.79	53	0.16	
Reading	1	Suburb	248,944	173.20	14.50	56	217,632	170.91	15.41	51	-0.15	
Reading	1	Town	78,704	172.08	13.71	53	66,309	170.23	13.99	48	-0.13	
Reading	2	City	243,059	184.63	16.71	50	200,212	181.31	18.37	42	-0.19	
Reading	2	Rural	158,926	187.78	15.06	59	144,779	184.95	16.06	52	-0.18	
Reading	2	Suburb	318,211	187.62	15.92	59	267,276	185.08	17.25	53	-0.15	
Reading	2	Town	87,506	186.31	15.23	55	75,037	183.54	16.21	48	-0.18	
Math	1	City	217,455	176.19	14.69	50	198,166	173.79	15.58	46	-0.16	
Math	1	Rural	145,320	178.82	12.77	59	141,130	177.50	13.26	56	-0.10	
Math	1	Suburb	260,887	178.57	13.80	58	234,287	176.99	14.65	55	-0.11	
Math	1	Town	81,261	177.24	13.01	54	72,317	176.28	13.49	51	-0.07	
Math	2	City	251,924	188.75	14.65	51	218,270	184.95	16.04	42	-0.25	
Math	2	Rural	161,832	191.46	12.92	60	153,330	188.73	13.75	52	-0.20	
Math	2	Suburb	315,232	191.71	13.77	60	278,317	188.67	15.00	52	-0.21	
Math	2	Town	89,409	190.38	13.21	56	78,210	187.59	14.29	48	-0.20	

Note. N = number of students, SD = standard deviation, perc. = percentile rank.

**Table 4***Average Fall-Spring Growth Rates during the 2021-22 School Year Relative to Pre-COVID Average Gains*

Subject	Grade	Pre-COVID (2018-19)			COVID (2021-22)			Ratio gains
		N	Mean fall-spring gain	SD fall-spring gain	N	Mean fall-spring gain	SD fall-spring gain	
Reading	1	637,165	16.10	9.09	584,534	15.02	9.35	0.93
Reading	2	765,620	13.85	9.59	686,946	13.94	10.13	1.01
Math	1	673,969	17.63	8.47	646,944	16.56	8.75	0.94
Math	2	789,397	15.18	8.29	735,210	15.03	8.47	0.99

Note. The pre-COVID sample columns show gains from the fall to spring of the 2018-19 school year as a reference to the COVID sample's 2021-22 fall-spring gains. Gains are calculated as spring RIT minus fall RIT for each grade/subject/year.

## ABOUT THE AUTHORS

Dr. Megan Kuhfeld is a senior research scientist for the Collaborative for Student Growth at NWEA. Her research seeks to understand students' trajectories of academic and social-emotional learning (SEL) and the school and neighborhood influences that promote optimal growth. Dr. Kuhfeld completed a doctorate in quantitative methods in education and a master's degree in statistics from the University of California, Los Angeles (UCLA).



Dr. Karyn Lewis is the director of the Center for School and Student Progress at NWEA, where she leads a team of researchers who operate at the intersection of K-12 education research, practice, and policy. Her research interests focus on the interplay between students' academic achievement and growth, their social-emotional development and well-being, and how they experience their school's climate. Prior to joining NWEA, she was a senior researcher at Education Northwest/REL Northwest, where she led a diverse portfolio of applied research, technical assistance, and evaluation projects centered around social-emotional learning. Dr. Lewis is a former data fellow with the Strategic Data Project at the Harvard Center for Education Policy Research. She completed a National Science Foundation-funded postdoctoral fellowship at the University of Colorado Boulder and earned a PhD from the University of Oregon in social psychology.



## ABOUT NWEA

For more than 40 years, NWEA has been a pioneer in educational research and assessment methodology with a focus on improving learning outcomes for every student. NWEA continues this discovery through dedicated research that explores foundational issues in education, practical challenges in today's schools, and the evolving role of technology in the lives of students. As a mission-based not-for-profit educational research organization, NWEA's research agenda reflects our commitment to attacking big challenges in education and measurement and empowering education stakeholders with actionable insights.

## ABOUT THE COLLABORATIVE FOR STUDENT GROWTH

The Collaborative for Student Growth at NWEA is devoted to transforming education research through advancements in assessment, growth measurement, and the availability of longitudinal data. The work of our researchers spans a range of educational measurement and policy issues, including achievement gaps, assessment engagement, social-emotional learning, and innovations in how we measure student learning. Core to our mission is partnering with researchers from universities, think tanks, grant-funding agencies, and other stakeholders to expand the insights drawn from our student growth database—one of the most extensive in the world.

## ABOUT THE CENTER FOR SCHOOL AND STUDENT PROGRESS

The Center for School and Student Progress (CSSP) engages directly with NWEA partner schools to influence education practices and policies that promote student success. The CSSP focuses on issues that impact the daily work of educators and the students they serve, such as achievement and growth patterns for traditionally underserved students, the integrity of testing systems, supporting college and career readiness, and school accountability. CSSP researchers also serve as consultative partners, offering advanced technical support, custom research projects, and analysis to school leadership, educators, and policymakers.

