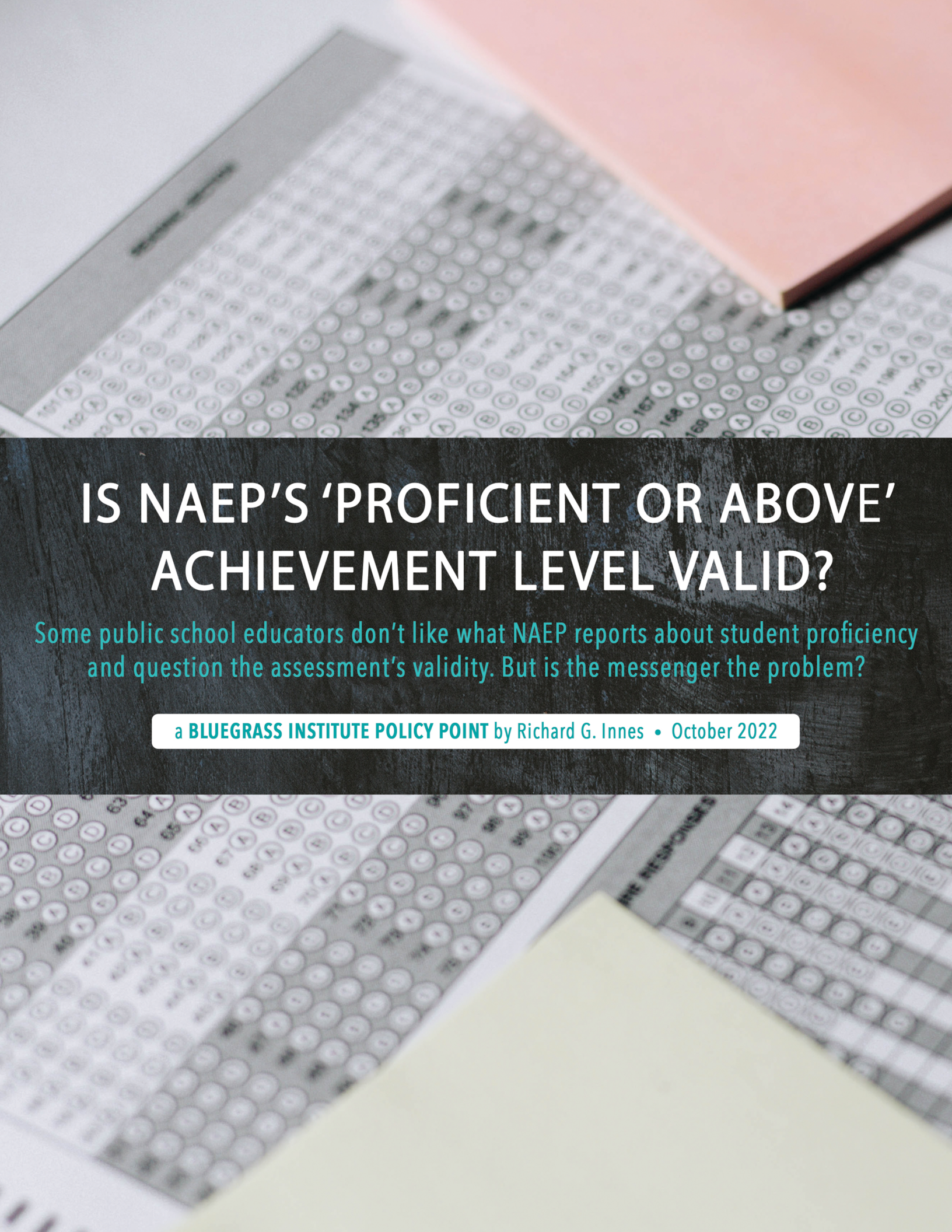
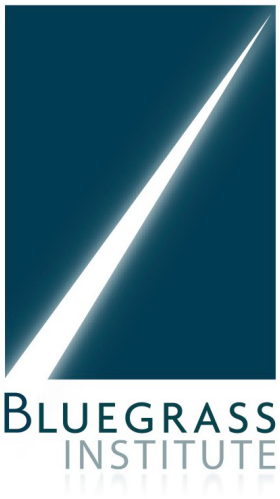


IS NAEP'S 'PROFICIENT OR ABOVE' ACHIEVEMENT LEVEL VALID?

Some public school educators don't like what NAEP reports about student proficiency and question the assessment's validity. But is the messenger the problem?

a **BLUEGRASS INSTITUTE POLICY POINT** by Richard G. Innes • October 2022



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Is NAEP's 'Proficient or Above' Achievement Level Valid?

Some public school educators don't like what NAEP reports about student proficiency and question the assessment's validity. But is the messenger the problem?

by Richard G. Innes

Introduction

It's pretty obvious. Some in the public education establishment loathe the Achievement Level reports generated by the federal National Assessment of Educational Progress (NAEP). In particular, some establishment cheerleaders – who tend to oppose changes to the status quo such as offering parents a choice of where children attend school – really detest the NAEP's Achievement Level scores, which report the percentage of students performing "Proficient or Above."

Given the generally low performance for the nation's public schools identified by NAEP's Achievement Level scores, it's not hard to understand why those scores upset public education folks. When the NAEP reports, as it did most recently in 2019, that the overall proportion of the nation's public school students scoring "Proficient or Above" for Grade 4 reading is only 34% and for Black students is only 18%,[1] it's understandable that some public school supporters seek to avoid the release and use of such information. To be sure, the NAEP proficiency rates generally are so low that no reasonable person would consider them acceptable performance, and the bad news from the NAEP is backed up by other evidence such as middling scores in international testing.[2]
In efforts to avoid disappointing evidence about the nation's public school performance, the education establishment attacks the validity of the messenger, creating reports claiming "Using NAEP's proficient level as a basis for education policy is a bad idea"[3] and blogs about "The Lies Promoted by NAEP's Absurd Benchmarks."[4]

Achievement Level scores are not realistic, NAEP's critics claim. The standard for NAEP Proficient is set too high, they fuss. In attempts to back their claims, NAEP's critics moan that true grade level performance is far lower than what it takes to score Proficient on NAEP. This is actually true, but no one who cares about students receiving an adequate education should find the current average performance in too many of our schools acceptable. Students need to perform better than the current average grade level performance.

But do all the attacks on the validity of NAEP's Achievement Level scores mesh with actual data, especially for the key level of NAEP Proficient? Is it wise to just ignore those NAEP results? For that matter, what performance is NAEP Proficient really related to?

The answers to those questions might surprise you, because an analysis of Kentucky student achievement shows that NAEP Proficient, at least for the eighth-grade testing, provides a valuable performance benchmark, one relating quite well to other tests that report on college and career readiness.

What does NAEP Proficient actually show?

To explore this question, Kentucky students' Proficient or Above rates from the NAEP Grade 8 math and reading assessments were compared to performances by the same cohorts of Kentucky students on several different tests from the ACT, Inc. Those ACT tests report the percentages of students whose

performances indicate they are on track, as of the grade where the testing occurred, to achieve college and career readiness in mathematics and reading.

We'll see that in all of the cases examined, the percentages of students scoring Proficient or Above on the NAEP Grade 8 Math and NAEP Grade 8 Reading assessments agree remarkably well with the percentages of students scoring at or above the ACT's Readiness Benchmark results identifying the proportion of test takers ready in those subjects for college or a living wage career.

Background on the various ACT tests

Over the years, the ACT, Inc. created a number of different tests. Unlike the better-known ACT college entrance test, some of the products were specifically designed for use in earlier grades. The EXPLORE test, for example, was designed for use with eighth graders, which allows direct comparisons to NAEP Grade 8 performances for the same cohorts of students.

The ACT EXPLORE Test

EXPLORE offers a scoring system that includes Readiness Benchmark Scores, which show the percentage of eighth graders on track – as of that grade – to be college and career ready upon high school graduation. Thus, EXPLORE Benchmark Scores function like the actual ACT college entrance test's Benchmarks. Those ACT college entrance test Benchmark Scores are empirically tied to actual college freshman course performance, reporting the proportion of students who have developed enough skill to be likely to earn at least a "C" in their first related college courses.[5]

Like the ACT, EXPLORE reports Benchmark Score data for both math and reading, subjects the NAEP has tested every other year from 2003 to 2019.

Kentucky administered the EXPORE test to essentially all of its Grade 8 public school students until the last year the test was offered by the ACT, Inc., the spring of 2015. Because virtually all Kentucky public school students were tested, there are no sampling errors with Kentucky's EXPLORE scores.

Sources of the EXPLORE data used in this report are found in the Endnotes.[6]

The ACT college entrance test

The other test providing readiness information examined in this paper is the actual ACT college entrance test. It also offers College Readiness Benchmark Scores empirically developed from actual grade point data for college freshmen. The Benchmark Scores identify performances correlated to a 75% probability that students will earn a "C" and a 50% chance of getting a "B" in their first related freshman year courses.[7]

Unlike most states, all Kentucky public school students have taken the ACT since 2009, ensuring there are no sampling errors.

There are some shortcomings in the available data on Kentucky's high school graduates' ACT College Readiness Benchmark Scores. Since scores for all of Kentucky's resident test takers are included in the data provided by ACT, Inc., results from some private school and home school students also are included. The presence of these nonpublic student results slightly degrades the data for use in this study. However, because Kentucky's public school students generally outnumber the nonpublic school test takers by a factor of about 10 to one,[8] overall average scores strongly correlate to what the public-school only scores would reveal.

About career readiness

Though many think of it as a college-focused organization, the ACT, Inc. is actually in an especially well-informed position to make claims about workforce readiness. ACT, Inc. collaborated with business and industry years ago to create its Work Keys assessments that are used by businesses to determine if applicants have sufficient education to succeed in their apprenticeship programs.[9] Thus, ACT, Inc. is well-informed about the actual skills needed to succeed in business and industry apprenticeship programs as noted in the following comment:

> "…whether planning to enter college or workforce training programs after graduation, high school students need to be educated to a comparable level of readiness in reading and mathematics. Graduates need this level of readiness if they are to succeed in college-level courses without remediation and to enter workforce training programs ready to learn job-specific skills."[10]

So, "college readiness" as defined by the ACT's Benchmark Scores is also related to being able to successfully enter a living wage, non-college career, as well.

Source of the ACT college entrance test data for high school graduating classes used in this report is the ACT's Data Visualization Tool.[11]

Some NAEP considerations

The Main NAEP, which is the source of the NAEP state and district data used in this paper, is based on the performance of a random sample of Kentucky's public school students. For example, while the state as of 2019 had about 49,000 students in its public school Grade 8 cohort, only about 3,100 were actually tested by the NAEP. The number of tested students represents a statistically representative sample of the student population, so we can confidently generalize about the overall performance of Kentucky students from the NAEP results.[12]

However, there are some important considerations related to how the NAEP samples students from the general population.

First, due to a testing procedure called Matrix Sampling,[13] each student taking the NAEP only is administered a portion of the full question set; so, meaningful information can only be obtained when the results from a number of students are averaged together.

Secondly, one inevitable consequence of the way the NAEP is conducted is that all the reported scores are actually only estimates of how the entire cohort would perform if all the students in it, not just a sample, were tested. Put another way, published NAEP results always have associated statistical plus and minus sampling errors. One way the NAEP quantitatively reports the size of those errors is via "Standard Errors."

Table 1 summarizes some representative NAEP Proficiency Rate results discussed later in this report and the standard errors associated with those reported proficiency rates.

Table 1

Representative NAEP Proficiency Rates for Kentucky and Standard Errors		
NAEP Assessment	**Reported Percentage Proficient or Above**	**Standard Error in the Reported Proficiency Rate**
Grade 8 Reading – All Students – 2015	36%	1.5
Grade 8 Math – All Students – 2015	28%	1.3
Grade 8 Reading – Black Students – 2015	15%	3.0
Grade 8 Math – Black Students – 2015	12%	2.3
Source: NAEP Data Explorer https://www.nationsreportcard.gov/ndecore/landing		

To employ the standard errors, consider that there is a 95% confidence level that the reported NAEP Proficiency rate lies within plus or minus two standard errors of the true result that would be obtained if the entire cohort of students actually were tested.[14]

For example, in the case of NAEP Grade 8 Reading for all students in 2015, the true proficiency rate is highly likely to lie somewhere between 33% and 39% (the NAEP-reported figure of 36% plus or minus two times 1.5).

The size of the standard error increases as the size of the pool of tested students gets smaller. For example, the least precise proficiency rate in the table is the 15% figure for Grade 8 Reading for Kentucky's Black students, which comprise only about 10% of the commonwealth's public school enrollment. The actual proficiency rate for Kentucky's Black students in 2015 for NAEP Reading could lie plus or minus six points from the published rate, or between 9% and 21%.

Such plus-and-minus variation in the true NAEP performances should be kept in mind as the following material is considered. In general, **after the sampling errors in the published NAEP proficiency rates are considered, the agreement between the NAEP and the ACT tests looks even better** than the already rather close agreements the graphs and tables show.

NAEP scores and standard errors were obtained from the online NAEP Data Explorer.[15]

How does NAEP compare to EXPLORE in Kentucky?

"All Student" reading and math

This first family of graphs in Figures 1 and 2 compares the overall EXPLORE Benchmark Score results for all Kentucky public school students to the percentage of the same year group cohort of students scoring Proficient or Above on the NAEP in reading and math.

Figure 1

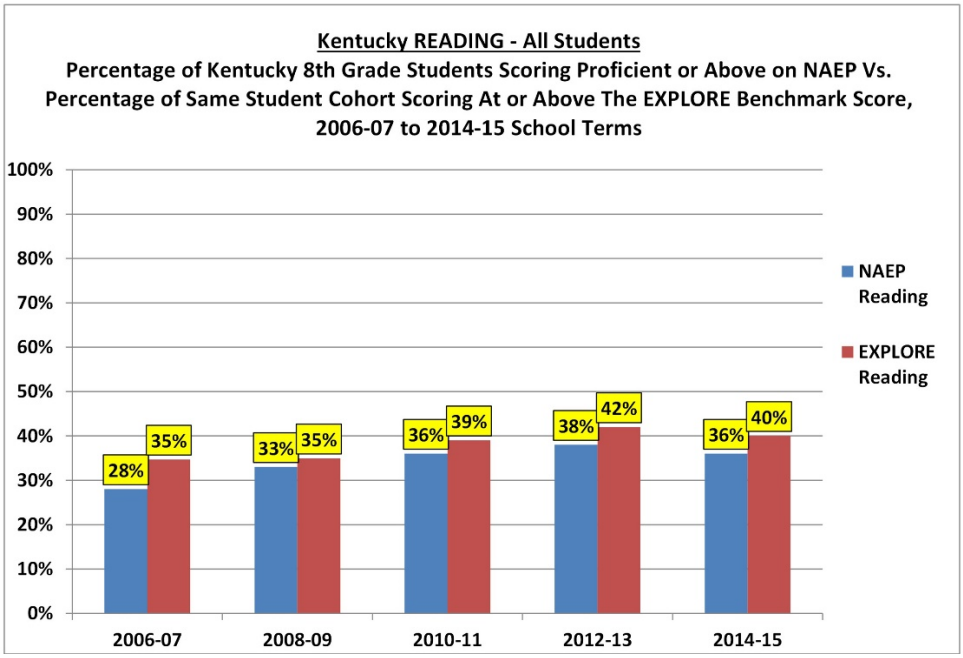
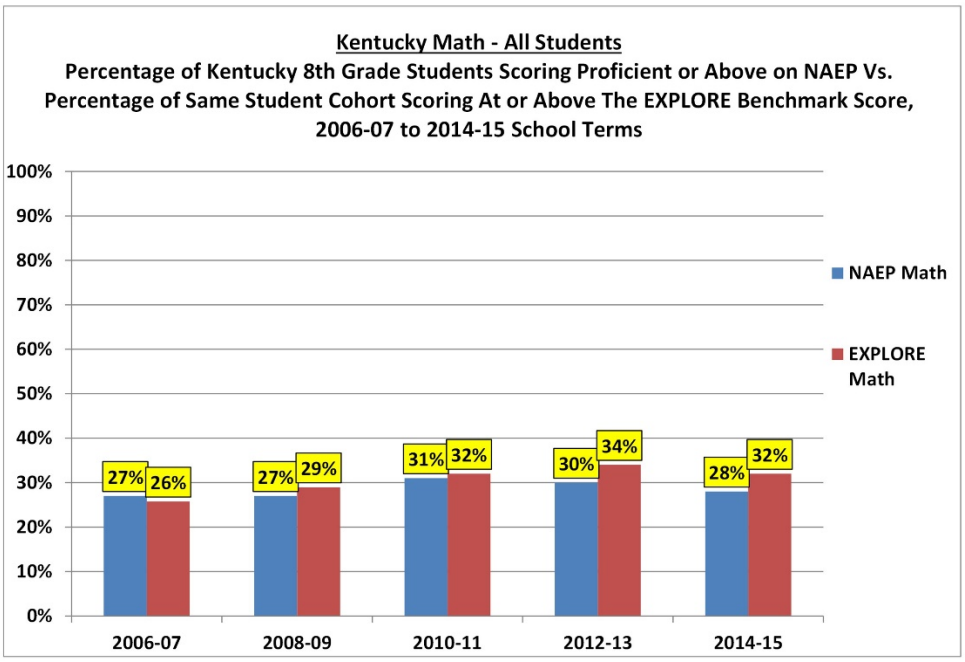


Figure 2



Agreement between the EXPLORE and NAEP is quite close for these "All Students" cohorts in both reading and math; with only one exception for reading in 2006-07, the difference is four points or less.

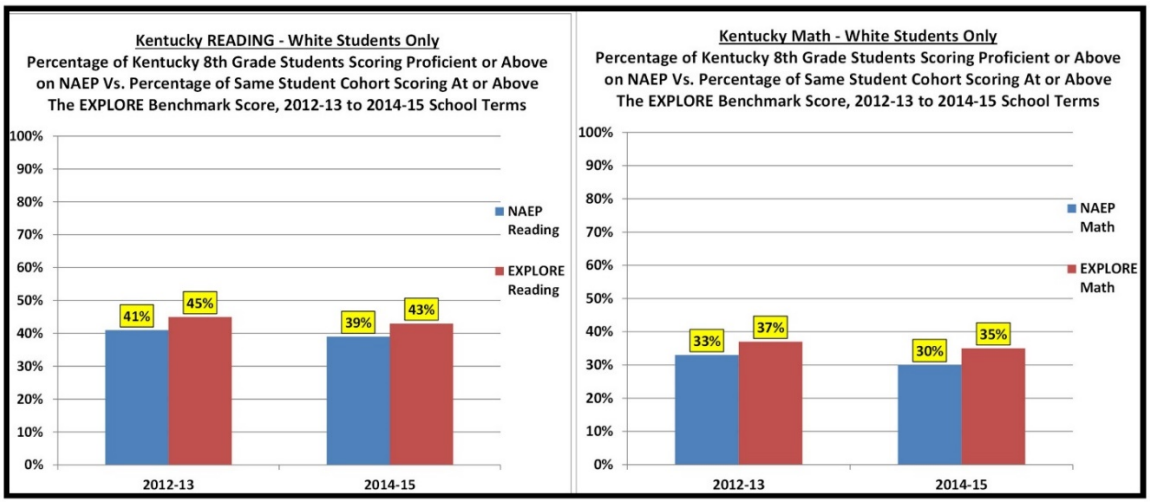
By way of comparison, in 2015 the Kentucky Performance Rating for Educational Progress (KPREP) state assessments showed Grade 8 reading proficiency averaged over all students was 54.1%, more than 18 points higher than the NAEP reported for the same cohort of students in this subject area.[16] The same year KPREP reported math proficiency for all Grade 8 students was 44.2%, over 16 points higher than what NAEP reported.

Clearly, the NAEP's Proficient or Above statistics for Grade 8 reading and math align closely with the EXPLORE information about college and career readiness. In fact, the alignment between NAEP and EXPLORE is notably better than the alignment between NAEP and KPREP.

White Students Reading and Math

It's possible for a test to work well with some groups but not for others. To see if such differential functioning is a factor in the NAEP-to-EXPLORE comparison, the available data was broken out by race. Unfortunately, Kentucky's EXPLORE data was not publicly available for student subgroups until 2013, but here are the results for the two comparison years where data are available. The first comparisons, shown in Figure 3, are for white public school student-only results in reading and math.

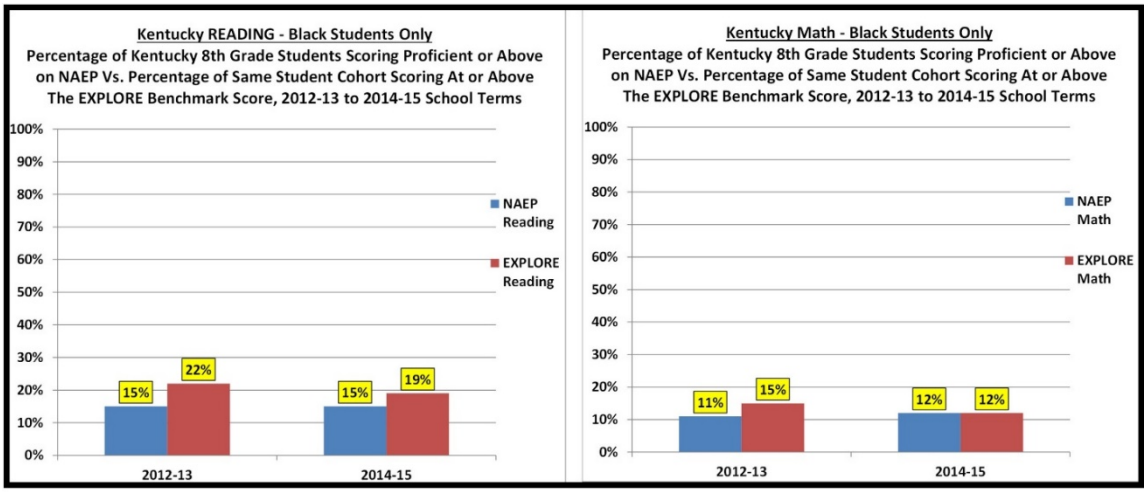
Figure 3



Again, the agreement in both subjects is quite close for both years. For comparison, the KPREP reported Grade 8 reading proficiency for white students in 2014-15 was 57.2% in reading (18.2 points higher than NAEP) and 47.4% in math (17.4 points higher than NAEP).

Figure 4 presents the available information about how Kentucky's public school Black students performed on EXPLORE and NAEP.

Figure 4

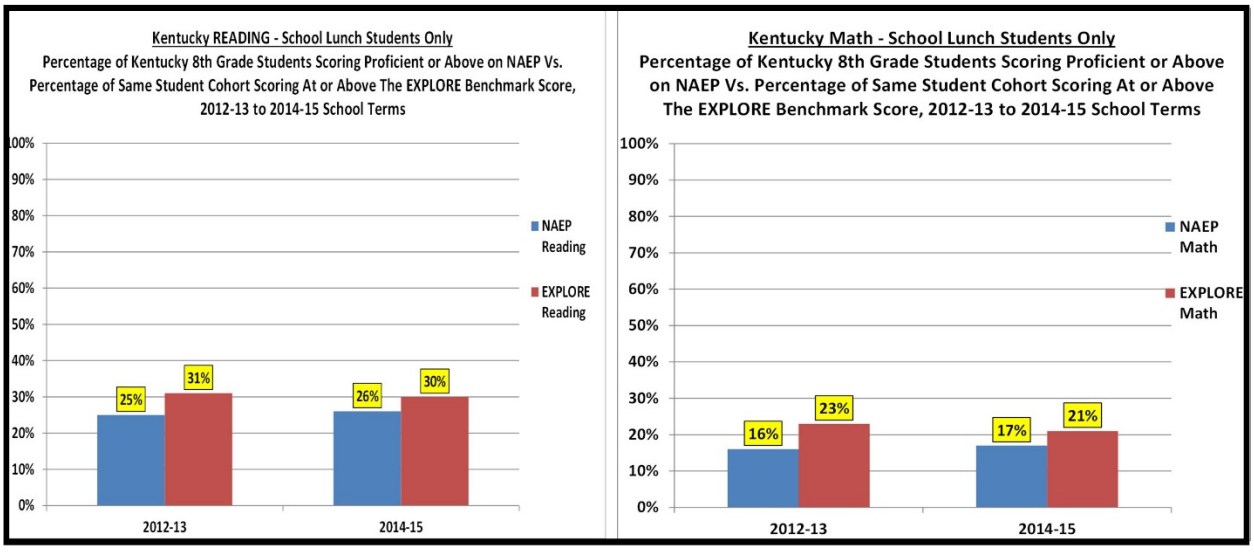


In 2014-15 KPREP reported Reading proficiency for Black eighth graders was 33.2% (18.2 points higher than NAEP) and math proficiency was 21.8% (9.8 points higher than NAEP).

Next, we look at the performance comparisons in reading and math for students who qualified for the federal free and reduced cost lunch program.

Regarding the reporting of school lunch eligibility, Kentucky continued to report only true, needs-eligible students in this category to the NAEP despite the introduction of the Community Eligibility Program (CEP) for lunches. Unlike for some other states, the validity of Kentucky's NAEP school lunch data as a proxy for student poverty is not impacted by the CEP. In other states, the CEP can result in even wealthy students being included in the lunch-eligible NAEP statistics. The NAEP has collected no information about which states are providing CEP or non-CEP impacted data, so in general lunch data reported by the NAEP from 2015 onward for states other than Kentucky should not be used as a valid poverty proxy unless the character of data reported can be positively determined.

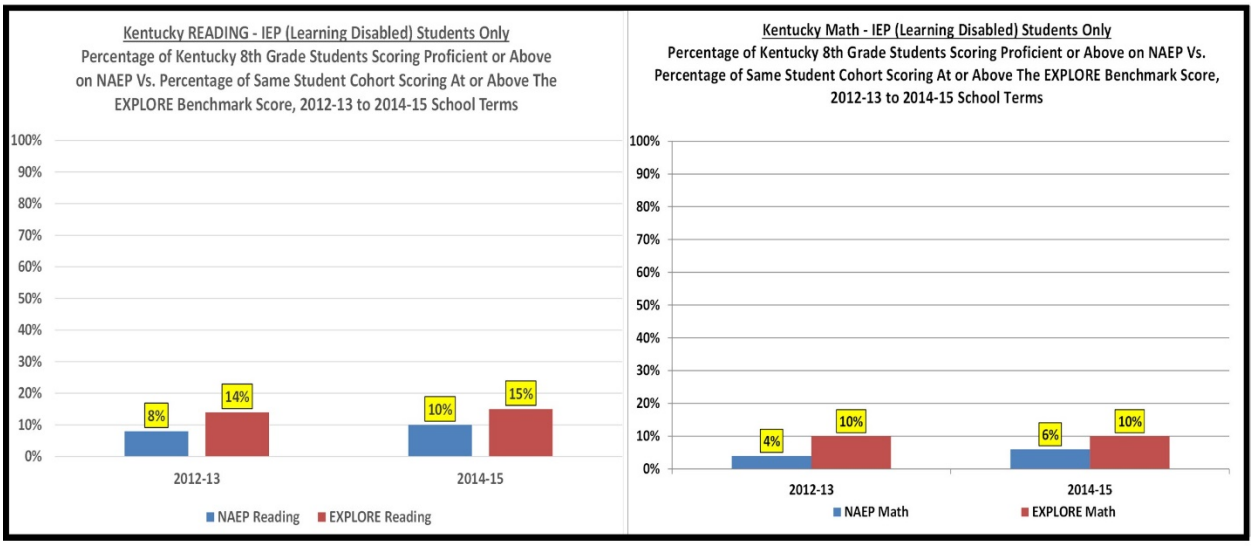
Figure 5



In 2014-15 KPREP reported Grade 8 reading proficiency for lunch-eligible students was 43.2% in reading (17.2 points higher than NAEP) and 32.6% in math (15.6 points higher than NAEP).

Finally, Figure 6 shows how students who qualified to have an Individual Education Plan (IEP) due to learning disabilities performed.

Figure 6



In 2014-15 KPREP reported reading proficiency for all learning-disabled students with an IEP was 18.3% (8.3 points higher than NAEP) and for math the proficiency rate was 14.9% (8.9 points higher than NAEP).

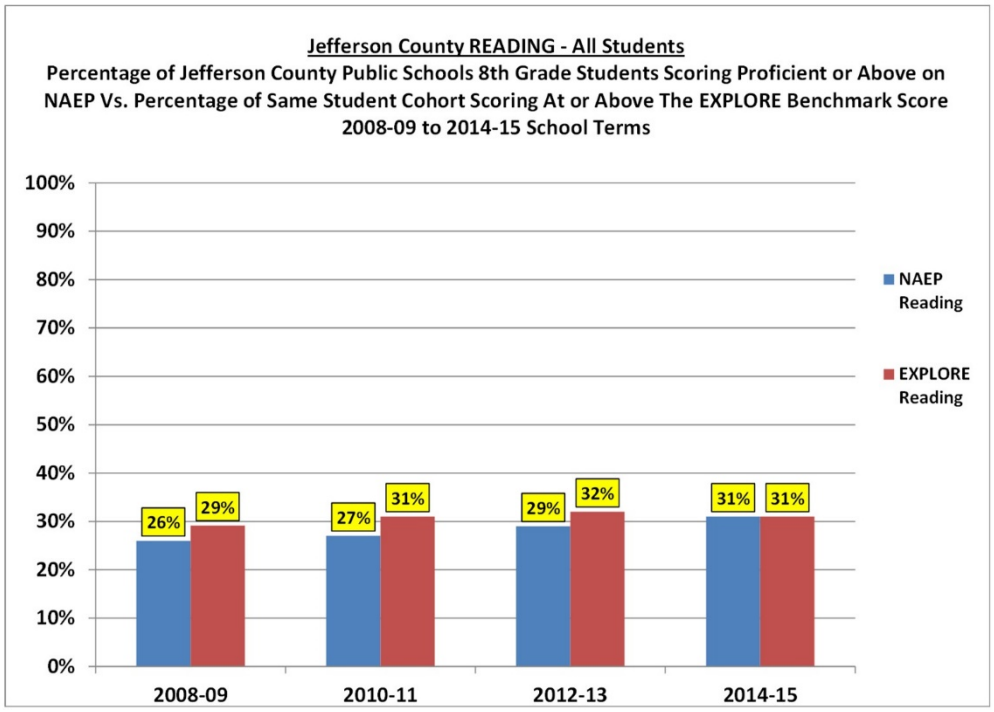
As you can see, in all cases in Figures 1 through Figure 6, the agreement between the NAEP Proficient or Above scores and the EXPLORE Readiness Benchmark scores is remarkably close. Also, in every case the agreement between NAEP and EXPLORE results is much better than the agreement between NAEP and KPREP. If the sampling errors in the NAEP scores are considered, the already close agreements with EXPLORE get even better.

Basically, regardless of student group, the EXPLORE's College and Career Readiness Benchmark scores and the statistics for the same students from the NAEP Proficient or Above results agree closely.

The key to recall here is that the EXPLORE Benchmark Scores are linked and equated by the ACT to actual college readiness data developed from the ACT college entrance test. Thus, based on the EXPLORE data available for Kentucky, the NAEP Proficient or Above Achievement Level appears to correlate closely with the level of performance needed for readiness for college and careers.

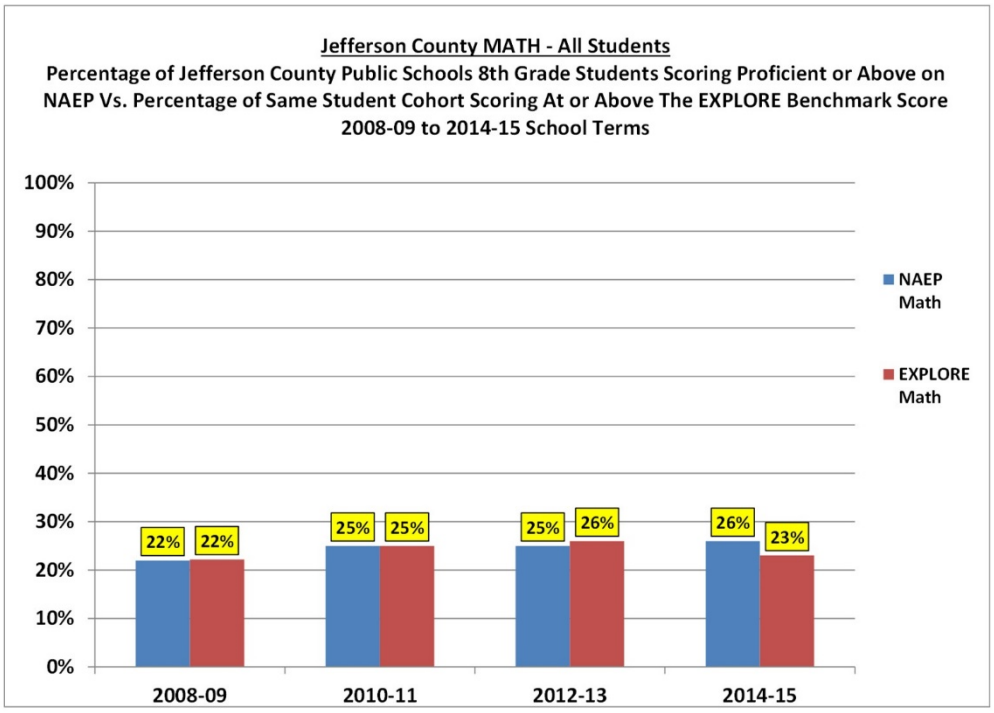
Another set of EXPLORE-to-NAEP data is also available due to the fact that Jefferson County Public Schools, Kentucky's largest district, participates separately in NAEP's Trial Urban District Assessment program. The next two figures show how that story worked out.

Figure 7



Jefferson County's KPREP Grade 8 Reading proficiency rate in 2014-15 was 45.9% (14.9 points higher than NAEP).

Figure 8



Jefferson County's KPREP Grade 8 Math proficiency in 2014-15 was 35.5% (9.5 points higher than NAEP).

Again, this entirely different sample of NAEP results shows agreement between EXPLORE College Readiness Benchmark results and NAEP Proficient or Above scores is remarkably close and notably better than the NAEP to KPREP agreement.

Comparison of NAEP directly to the ACT for the same student cohorts

Yet another comparison of NAEP to a test with known college and career ready data is available. This separate analysis looks at several examples of NAEP Grade 8 performance compared to the same student cohort's graduating class ACT score results for reading and math posted four years later. It's important to understand the same cohort of students produced both sets of scores, though in different years.

The data are organized into different tables for reading and math based on the graduation year of the cohort. Standard Errors in the NAEP Proficiency rates are included.

Table 2

Comparison of Reading Scores for Kentucky from the National Assessment of Educational Progress and the ACT College Entrance Test for the Graduating Class of 2017				
	Overall Average For All Students	Whites	Blacks	Hispanics
Percent of Kentucky's 2017 High School Graduates Meeting the ACT Reading College Readiness Benchmark Score - All Students, Public, Private, Homeschool	41%	46%	19%	34%
Percent of Kentucky's Grade 8 Students Scoring Proficient or Above on the NAEP 2013 Reading Assessment - Public School Only	38%	41%	15%	30%
Standard Error in the NAEP 2013 Reading Proficiency Rate	1.4	1.5	2.5	5.1

Table 3

Comparison of Math Scores for Kentucky from the National Assessment of Educational Progress and the ACT College Entrance Test for the Graduating Class of 2017				
	Overall Average For All Students	Whites	Blacks	Hispanics
Percent of Kentucky's 2017 High School Graduates Meeting the ACT Math College Readiness Benchmark Score - All Students, Public, Private, Homeschool	30%	34%	11%	23%
Percent of Kentucky's Grade 8 Students Scoring Proficient or Above on the NAEP 2013 Math Assessment - Public School Only	30%	33%	11%	17%
Standard Error in the NAEP 2013 Math Proficiency Rate	1.2	1.3	2.3	4.4

Table 4

Comparison of Reading Scores for Kentucky from the National Assessment of Educational Progress and the ACT College Entrance Test for the Graduating Class of 2019				
	Overall Average For All Students	Whites	Blacks	Hispanics
Percent of Kentucky's 2019 High School Graduates Meeting the ACT Reading College Readiness Benchmark Score - All Students, Public, Private, Homeschool	40%	45%	17%	29%
Percent of Kentucky's Grade 8 Students Scoring Proficient or Above on the NAEP 2015 Reading Assessment - Public School Only	36%	39%	15%	31%
Standard Error in the NAEP 2015 Reading Proficiency Rate	1.5	1.8	2.2	5.3

Table 5

Comparison of Math Scores for Kentucky from the National Assessment of Educational Progress and the ACT College Entrance Test for the Graduating Class of 2019				
	Overall Average For All Students	Whites	Blacks	Hispanics
Percent of Kentucky's 2019 High School Graduates Meeting the ACT Math College Readiness Benchmark Score - All Students, Public, Private, Homeschool	29%	33%	10%	20%
Percent of Kentucky's Grade 8 Students Scoring Proficient or Above on the NAEP 2015 Math Assessment - Public School Only	28%	30%	12%	21%
Standard Error in the NAEP 2015 Math Proficiency Rate	1.3	1.5	2.3	4.5

Table 6

Comparison of Reading Scores for Kentucky from the National Assessment of Educational Progress and the ACT College Entrance Test for the Graduating Class of 2021				
	Overall Average For All Students	Whites	Blacks	Hispanics
Percent of Kentucky's 2021 High School Graduates Meeting the ACT Reading College Readiness Benchmark Score - All Students, Public, Private, Homeschool	36%	41%	15%	24%
Percent of Kentucky's Grade 8 Students Scoring Proficient or Above on the NAEP 2017 Reading Assessment - Public School Only	34%	37%	16%	28%
Standard Error in the NAEP 2017 Reading Proficiency Rate	1.2	1.5	2.2	4.1

Table 7

Comparison of Math Scores for Kentucky from the National Assessment of Educational Progress and the ACT College Entrance Test for the Graduating Class of 2021				
	Overall Average For All Students	Whites	Blacks	Hispanics
Percent of Kentucky's 2021 High School Graduates Meeting the ACT Math College Readiness Benchmark Score - All Students, Public, Private, Homeschool	27%	31%	9%	15%
Percent of Kentucky's Grade 8 Students Scoring Proficient or Above on the NAEP 2017 Math Assessment - Public School Only	29%	32%	9%	21%
Standard Error in the NAEP 2017 Math Proficiency Rate	1.2	1.5	1.8	3.8

In all cases shown in Tables 2 through 7, even without any consideration of the sampling errors in the NAEP scores, there is a good match between the percentage of students scoring at or above the ACT College Readiness Benchmark scores and the percentage of the same student cohorts that scored at or above NAEP Proficient four years earlier when that group was in the eighth grade. The agreement is often perfect when sampling errors in the NAEP scores are considered.

For example, consider the apparent six-point difference in Table 7 in the NAEP and ACT scores for Hispanics. Once the plus or minus two standard errors' adjustment is made to the published Hispanic NAEP proficiency rate, the ACT rate is a match for this ethnic group. A similar comment pertains to the apparent six-point difference in Hispanic results in Figure 3.

Again, a small degree of an apples-to-oranges limitation with this NAEP to ACT analysis exists because a small number of nonpublic school students' ACT scores are included. However, the impact is probably not significant due to the much larger proportion of public school students (about 10 to 1) in the overall ACT results.

Summing up

In all the comparisons shown in this paper, the agreement between the NAEP Proficient or Above scores and the ACT's College and Career Ready Benchmark scores are remarkably close, often lying well within the plus-and-minus sampling errors found in all NAEP score estimates. Thus, at least for the eighth grade NAEP results, despite what naysayers claim, it appears NAEP Proficient provides useful information about student preparation for college and/or careers that should not be summarily dismissed.

Furthermore, the NAEP shows at present that the performance of far too many public school students both in Kentucky and nationwide isn't nearly as good as it needs to be. This disturbing conclusion is backed up by current results shown in Tables 6 and 7 from the ACT college entrance test, which show similar – and unacceptably low – levels of preparation based on actual performances of college freshmen.

Richard G. Innes is staff education analyst for the Bluegrass Institute for Public Policy Solutions, Kentucky's free-market think tank. He blogs frequently at www.bipps.org and can be reached at dinnes@freedomkentucky.com.

ENDNOTES

[1] Source: NAEP Data Explorer web tool. Online at: https://www.nationsreportcard.gov/ndecore/landing.

[2] The US certainly doesn't score at the top on international testing. Even when the Brookings Institution tried to put as happy a face as possible on it, the results are still disappointing. See Serino, Louis, "What international test scores reveal about American education," The Brookings Institute, Brown Center Chalkboard, April 7, 2017. Online at: https://www.brookings.edu/blog/brown-center-chalkboard/2017/04/07/what-international-test-scores-reveal-about-american-education/. Also see: Rowley, Kristie J., et al, "U.S. Underperformance in an International Context," Teachers College Record, 2019. Online here: https://www.tcrecord.org/Content.asp?ContentID=22763.

[3] Loveless, Tom, "The NAEP proficiency myth," Brown Center Chalkboard, Brookings Institution, June 13, 2016. Online at: https://www.brookings.edu/blog/brown-center-chalkboard/2016/06/13/the-naep-proficiency-myth/#:~:text=NAEP%20is%20a%20general%20assessment%20of%20knowledge%20and,validity%20of%20the%20achievement%20levels%20themselves%20is%20questionable.

[4] Ravitch, Diane, "The Lies Promoted by NAEP's Absurd Benchmarks," A Blog Posted May 24, 2022. Online at: https://dianeravitch.net/2022/05/24/james-harvey-the-lies-promoted-by-naeps-absurd-benchmarks/.

[5] For more about the ACT Benchmark Scores, see ACT, Inc., "What Are the ACT College Readiness Benchmarks?" Online at: https://www.act.org/content/dam/act/unsecured/documents/benchmarks.pdf.

[6] The "All Student" Kentucky and Jefferson County Public Schools EXPLORE Benchmark results were available in an Excel Spreadsheet online here:
http://openhouse.education.ky.gov/Data/Download?file=EXPLORE%20Benchmarks%20Listing%202014-2015.xls&path=Assessment
This link is no longer active but can be accessed using the Wayback Machine.
The expanded state-level EXPLORE results by race, school lunch eligibility and Individual Education Plan (IEP - students with learning disabilities) status beginning in 2012-13 are available in the Kentucky School Report Cards, "Data Sets" area available here:
https://applications.education.ky.gov/src/Default.aspx

[7] ACT, Inc., "What Are the ACT College Readiness Benchmarks?" Online at: https://www.act.org/content/dam/act/unsecured/documents/benchmarks.pdf.

[8] For example, see Innes, Richard, "ACT for Kentucky's public and nonpublic school students over the years," Bluegrass Policy Blog, November 4, 2019. Online at: https://bipps.org/blog/act-for-kentuckys-public-and-non-public-school-students-over-the-years. In 2019 there were 4,522 nonpublic school and 46,851 public school high school graduates who took the ACT. Thus, only about 9% of all the students were nonpublic.

[9] For more information about ACT Work Keys, see: https://www.act.org/content/act/en/products-and-services/workkeys-for-employers/assessments.html.

[10] ACT, Inc., "Ready for College and Ready for Work: Same or Different?" Online at: https://www.act.org/content/dam/act/unsecured/documents/ReadinessBrief.pdf.

[11] The ACT Data Visualization Tool is online here: https://www.act.org/content/act/en/research/services-and-resources/data-and-visualization/grad-class-database-2021.html.

[12] See NAEP 2019 Technical Appendix Reading, Table R_TableA-3. Online at: https://www.nationsreportcard.gov/reading/supportive_files/2019_technical_appendix_reading.xlsx.

[13] NAEP documentation explains, “In matrix sampling, different portions from the entire pool of assessment questions are printed in separate booklets and administered to different but equivalent samples of students. Matrix sampling allows NAEP to assess the entire subject area within a reasonable amount of testing time.” https://edsource.org/wp-content/uploads/old/NAEP_Sampling_Frequently_Asked_Questions.pdf.

[14] NAEP confidence intervals and standard errors are briefly discussed here: https://nces.ed.gov/nationsreportcard/NDEHelp/WebHelp/confidence_intervals1.htm#:~:text=An%20estimated%20sample%20average%20scale%20score%20plus%20or,percent%20confidence%20interval%20for%20the%20corresponding%20population%20quantity.

[15] NAEP percentages of students scoring "Proficient or Above" in math and reading are from the NAEP Data Explorer: https://www.nationsreportcard.gov/ndecore/landing.

[16] The 2014-15 KPREP Data Sets can be accessed here: https://applications.education.ky.gov/src/DataSets.aspx. The ASSESSMENT_KPREP_GRADE Excel spreadsheet with the by-grade results can be accessed from the “Assessment” section of this web page.