

Mapping State Proficiency Standards Onto NAEP Scales:

Results From the 2013 NAEP Reading and
Mathematics Assessments





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What Is NAEP?

The National Assessment of Educational Progress (NAEP) is an assessment program conducted by the National Center for Education Statistics (NCES) to inform the public of what elementary and secondary students in the United States know and can do in various subject areas, including reading, mathematics, and science. Since 1969, NAEP, also known as The Nation's Report Card™, has been administered periodically to students at grades 4, 8, and 12 in order to report results for the nation, participating states, and selected large urban school districts. The National Assessment Governing Board oversees and sets policy for the NAEP program. Additional information about NAEP is available at <http://nces.ed.gov/nationsreportcard/>.

Executive Summary

Under the 2001 reauthorization of the Elementary and Secondary Education Act of 1965, states developed their own assessments and set their own proficiency standards to measure student achievement. This has resulted in a great deal of variation among the states, both in their proficiency standards and in their student assessments (NCES 2008-475). This variation has created a challenge in understanding the ability levels of students across the United States because there is no means to compare the proficiency levels established by one state against the others directly. To address this need, the National Center for Education Statistics (NCES) has published periodic reports for the past 10 years in which the National Assessment of Educational Progress (NAEP) is used as a common metric for examining the proficiency standards set by states in reading and mathematics in grades 4 and 8.

This report, the fifth in the series, presents the results of applying a methodology for mapping state proficiency standards onto the NAEP scales by using state public school data for the 2012–13 school year and the 2013 NAEP assessments in reading and mathematics for grades 4 and 8.¹ The report also includes analyses of the results using the 2011 NAEP and state assessment data and revised estimates for 2009 reported in NCES 2011-458. The key finding is that the variation among state achievement standards continues to be wide.

Grade 4

- In reading, the difference in NAEP equivalent scores between the states with the highest and lowest proficiency standards is about 76 points on the NAEP 0–500 scale. This difference is about twice the size of

the standard deviation on the NAEP national grade 4 reading assessment (37 points) and more than twice the 30-point difference between *Basic* and *Proficient* performance levels for NAEP grade 4 reading.

- In mathematics, the range of NAEP equivalent scores from the state with the lowest to the state with the highest proficiency standards is 49 points on the NAEP 0–500 scale, about one and a half times the size of the standard deviation of the NAEP mathematics scores for public school students (30 points) and about one and a half times the 35-point difference between *Basic* and *Proficient* performance on NAEP set for grade 4.

Grade 8

- In reading, the difference in NAEP equivalent scores between the states with the highest and lowest proficiency standards is 83 points on the NAEP 0–500 scale. This difference is about twice the size of the standard deviation on the NAEP national grade 8 reading assessments (34 points) and about twice the 38-point difference between *Basic* and *Proficient* performance on NAEP set for grade 8.
- In mathematics, the 60-point distance separating the highest and lowest proficiency standards is about one and a half times the size of the standard deviation of the NAEP mathematics scores for public school students (36 points) and one and a half times the 37-point distance between NAEP *Basic* and *Proficient* performance set for grade 8 mathematics.

Although the wide variation in standards persists, the number of states with grade 4 reading standards at or above

¹ The mapping methodology and previous results are discussed in detail in two previous reports (NCES 2010-456 and NCES 2011-458), available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>. Those reports, unlike the present one, focused more on changes in individual state standards over time and corroboration by NAEP of achievement gains reported by states.

the NAEP *Basic* level increased from 15 in 2009 and 20 in 2011 to 25 in 2013. Although in 2009 and 2011 no state standard was in the NAEP *Proficient* range, in 2013 two states had grade 4 reading standards in that range. In mathematics, the number of states with grade 4 standards at or above the NAEP *Basic* level also increased, from 44 in 2009 to 46 in 2011 and 47 in 2013, with five states having standards in the *Proficient* range in 2013 compared with one state each in 2009 and 2011.

At grade 8, the number of states with reading standards at or above the NAEP *Basic* level increased from 35 in 2009 and 36 in 2011 to 41 in 2013 (with one state standard in the *Proficient* range in 2013 compared with none in the previous years). In mathematics, 41 out of the 49 states included in the study had standards above the NAEP *Basic* level, an increase from 39 both in 2009 and 2011; three of these state standards were also above the *Proficient* level, compared with one state standard in 2009 and two in 2011.

Introduction

During the 1990s, driven by the standards-based reform, many states set achievement standards for their students and, by the end of the decade, most states were in the process of determining cut scores on their own tests that represented concepts with names such as *basic* or *proficient*. The 2001 reauthorization of the Elementary and Secondary Education Act of 1965 required all states to define what was required for a student to be labeled *proficient* in reading and mathematics for grades 3 to 8 but left to each of them the decision as to what score would be chosen as the cut score for meeting a given proficiency standard. Because each state set its own standards, there was no assurance that students who met the standards of one state would be able to meet the standards of another state, and one could not compare the effectiveness of schools across states in terms of the percentages of students reported to meet the standards. Therefore, comparing the stringency of the standards set by states would have been impossible had Congress not also included in the law the requirement that any state receiving Title I funds also be required to participate in the National Assessment of Educational Progress (NAEP) assessments. Knowing what percentage of a state's students performed at or above its cut point for proficiency on the state assessment, coupled with the state's performance on NAEP, allowed the National Center for Education Statistics (NCES) to estimate where the expectation each state has for what students should learn or know falls on the NAEP scales—that is, NAEP provided a common scale on which the stringency of the various state criteria for proficiency could be compared.

This report highlights the results of applying the methodology for mapping state proficiency standards onto the NAEP scales by using state public school data from the 2012–13 academic year and the 2013 NAEP reading and mathematics assessments for grades 4 and 8. The results of the mappings of state proficiency standards for the earlier years—2009 and 2011—also are included in this report to provide context for the analysis.^{1,2}

Mapping States' Standards Onto the NAEP Scales

The NAEP score that corresponds to a state's standard (i.e., the NAEP scale equivalent score) is determined by a direct application of equipercentile mapping. For a given subject and grade, the percentage of students reported in the state assessment to be meeting the standard in each NAEP school is matched to the point on the NAEP achievement scale corresponding to that percentage. For example, if the state reports that 70 percent of the students in fourth grade in a school are meeting the state's reading achievement standards and 70 percent of the students in the NAEP achievement distribution in that school are at or above 229 on the NAEP scale, then the best estimate from that school's results is that the state's standard is equivalent to 229 on the NAEP scale. The results are then aggregated over all of the NAEP schools in a state to provide an estimate of the NAEP scale equivalent of the state's threshold for its standard.³

Each state has its own expectation of what students should learn or know, and performance standards represent these expectations. Therefore, even if two states report the same

¹ Previous reports are available online at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>.

² Subsequent to the release of the 2009 mapping study (NCES 2011-458), it was determined that, for a number of states, the performance data used in the analyses included results of students who took their states' alternate assessment. Given that this is not the population of students measured by NAEP, the estimates for 2009 were revised using performance data acquired directly from the states. These revised estimates are discussed in appendix B of this report and available at http://nces.ed.gov/nationsreportcard/studies/statemapping/2013_naep_state_table.aspx.

³ The mapping methodology is discussed in detail in the 2007 mapping report (NCES 2010-456), pp. 5–13; and the 2009 mapping report (NCES 2011-458), pp. 6 and 30–31. In addition, a brief description is available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>.

percentage of students meeting their own standards, those standards are likely to map onto the NAEP scale at different points (i.e., different states' standards will have different NAEP scale equivalent scores).

The Validity of the Mapping

Because the only data used in the mapping are the percentages of students in each NAEP-participating school meeting the state standard and the distribution of NAEP scores, additional information is needed to test the validity of the mapping. The correlation between the percentage of students meeting the state standard, as reported by schools, and the percentage of students meeting standards as estimated from NAEP provides a straightforward measure of the appropriateness of the mapping. However, it does not indicate the amount of error that is added to the placement of the standard given the fact that NAEP and the state assessment may not measure exactly the same knowledge and skills (i.e., the amount of error that is added because of systematic differences between NAEP and the state assessment).

To evaluate the amount of this error, we measure how well the mapping procedure reproduces the percentage of students reported by the state as meeting the standard for each NAEP-participating school. If the mapping were error free, these would be in complete agreement. Nevertheless, some discrepancies will arise from random variation. This discrepancy should not be noticeably larger than would be accounted for by simple random variation. If it is noticeably larger than would be expected if NAEP and the state assessment were as similar to one another as possible in terms of the test specifications and statistical criteria, then we note that the validity of the mapping is questionable—that is, the mapping appears to apply differently in some schools than in others. In other words, the mapping procedure is valid to the degree that the procedure reproduces the individual school percentages meeting the standard. If the state assessment and NAEP are measuring different, uncorrelated characteristics of students, the NAEP estimates for individual schools will bear no relationship to the percentages that are based on the state assessment.

Relative error, which is defined as the fraction of the total variation in the percentage of students meeting the standard across schools, provides an estimate of the amount of error due to systematic differences between the two assessments. When the relative error is greater than .5 (i.e., the mapping error accounts for more than half of the total variation), then it is considered to be too large to support useful inferences from the placement of the state standard on the NAEP scale without additional evidence.⁴

The relative error is not expressed in the metric of NAEP scores. Hence, it cannot be combined with the standard error of the mapping in the estimation of the total mapping error. The inability to devise a single measure of total mapping error can lead to the following anomalies:

- States sharing the same tests and achievement standards may have statistically different cut points mapped onto NAEP, indicating that with the use of NAEP as a common metric, the standards for these states are not necessarily the same.
- Over time, a change in the mapped cut points (i.e., the NAEP scale equivalent scores) may occur even though a state nominally did not change its standards.

In the first case, differences in NAEP scale equivalents could be accounted for by curricular differences or practices between the states, thereby affecting the skills learned and tested in the two assessments. In the second case, differences in NAEP scale equivalents over time might reflect actual changes in state assessments, implicit changes in state standards, or changes in policies or practices that occurred between assessment years. For example, if retest or accommodation policies were changed, even without any changes in the test scoring systems, there could be an implicit change of standards that could be detected statistically by the mapping procedure used.

With the introduction of the Common Core State Standards, changes to curriculum and instruction are occurring at different rates across districts and schools. Moreover, until assessments designed to measure achievement on the basis

⁴ Additional details on the mapping methodology and relative error are available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>. Both are discussed in detail in the 2007 mapping report (NCES 2010-456), pp. 5–13; and the 2009 mapping report (NCES 2011-458), pp. 6 and 35. For a summary of the estimation of relative errors, refer to page 7 of section 2 of [NCES 2010-456](#).

of the Common Core State Standards are operational, state assessments are likely to remain aligned with their current achievement standards. Therefore, the mapping procedure likely will produce different NAEP scale equivalents for states with the same assessment and achievement standards, as well as for states that have not changed standards between two assessment years (e.g., 2011 and 2013).

NCES is in the process of investigating whether a measure of total error that would account for both sources of variation can be developed to address these issues. Until such a measure is available, NCES does not encourage comparisons of trends in the estimated rigor of an individual state proficiency standard. Thus, this report focuses only on the cross-sectional results covering each of three years: the 2013, 2011, and 2009 NAEP reading and mathematics assessments in grades 4 and 8.

Cautions in Interpretation

The mapping methodology does not allow scores of individual students on two tests to be linked; therefore, the results of this study cannot be used, for example, to map a student's score onto a test score in a second state.

In addition, the mapping methodology is not designed as an evaluation of the various state assessments. State assessments and NAEP are developed for different purposes and have different goals, and they may vary in format and administration. Findings of different standards, different trends, and different achievement gaps are presented without suggestion that they be considered as deficiencies either in state assessments or in NAEP.

The analyses in this report do not address questions about the content, format, exclusion criteria, or conduct of state assessments in comparison with NAEP. State assessments and their associated proficiency standards are designed to provide pedagogical information about individual students to their parents and teachers, whereas NAEP is designed to provide performance information at an aggregate level. Also,

the analyses in this report do not address any changes in state assessments or proficiency standards that may have occurred after 2013.

Mapping state achievement standards onto NAEP and comparing them with NAEP achievement levels gives context to the discussion, but it does not imply that the NAEP achievement levels are more valid than the state standards or that states should emulate NAEP standards. A wide range of policy considerations are involved in setting achievement standards, and what is appropriate for NAEP may not be the best fit for a given state. NAEP's achievement levels are used to interpret the meaning of the NAEP scales.⁵ NCES has determined (as indicated by NAEP's authorizing legislation) that NAEP achievement levels should continue to be used on a trial basis and should be interpreted with caution.

Regardless of their limitations, this and previous NCES mapping studies provide valuable information in helping to understand the myriad state assessment results that are otherwise difficult to compare and serve a policy need for reliable information that compares state standards.

In this report, findings are reported based on a statistical significance level set at .05. When comparisons are made, terms like *widened* or *narrowed* indicate statistically significant findings. Percentages and differences were computed using unrounded numbers, so the results may differ from what would be obtained using the rounded numbers in figures and tables. In the figures in the report, a black triangle under a state name indicates that the relative error is greater than .5, and the results should be interpreted with caution. Furthermore, California and Virginia are not included in the analyses for grade 8 mathematics because they do not assess general mathematics in grade 8. The NAEP scale equivalent scores for Maine, New Hampshire, Rhode Island, and Vermont, states participating in the New England Common Assessment Program (NECAP), are estimated considering them as a single jurisdiction.⁶

⁵ NAEP achievement levels define what students should know and be able to do: *Basic* indicates partial mastery of fundamental skills, and *Proficient* indicates demonstrated competency over challenging subject matter. Additional information on NAEP achievement levels is available at <http://nces.ed.gov/nationsreportcard/achlevdev.aspx>.

⁶ Since 2005, students in New Hampshire, Rhode Island, and Vermont have participated in NECAP. Maine joined the assessment program in 2009. The NECAP states share a common assessment and grade-level expectations.

Data Sources

The analyses in this report are based on NAEP and state assessment results for public schools that participated in the grade 4 and grade 8 NAEP assessments in reading and mathematics. The analyses use data from (a) NAEP data files for the 50 states and the District of Columbia (hereinafter referred to as a state) participating in the 2011 and 2013 reading and mathematics assessments and (b) state assessment school-level achievement data for the 2010–11 and 2012–13 school years provided by the states. The state data exclude results from alternate assessments used to evaluate the performance of students who are unable to participate in general state assessments even with accommodations.

The NAEP data used in this report are based on the administration of NAEP assessments to a sample of students

from selected public schools in each state in grades 4 and 8. The files include NAEP achievement data for each selected student. Because state assessment data are available only at the school level, as an initial step in the analysis, NAEP data were aggregated to the school level as well. These school-level data then were aggregated to the state level, taking into account the number of students in the grade at the school.⁷

Organization of This Report

The remainder of this report presents the analyses that examined the mapping results for 2013 in reading and mathematics at grades 4 and 8. The appendices contain technical notes and tables that complement the text, tables, and figures in the body of the report.

⁷ Additional information on the sampling and weighting that NAEP uses is available at <http://nces.ed.gov/nationsreportcard/tdw>.

State Performance Standards

The results of the mappings of the state standards onto NAEP for 2013 are presented below for reading and mathematics in grades 4 and 8. The key finding is that the variation of state achievement standards continues to be wide.

- In grade 4 reading, the difference in NAEP equivalent scores between the states with the highest and lowest proficiency standards is about 76 points on the NAEP 0–500 scale. This difference is about twice the size of the standard deviation on the NAEP national grade 4 reading assessment (37 points) and more than twice the 30-point difference between *Basic* and *Proficient* performance levels for NAEP set for grade 4.

The number of states with grade 4 reading standards at or above the NAEP *Basic* level increased from 15 in 2009 and 20 in 2011 to 25 in 2013. Although in 2009 and 2011 no state standard was in the NAEP *Proficient* range, in 2013 two states had grade 4 reading standards above the *Proficient* level.

- In grade 4 mathematics, the range of NAEP equivalent scores for the states with the highest and lowest proficiency standards is 49 points on the NAEP 0–500 scale, about one and a half times the size of the standard deviation of the NAEP mathematics scores for public school students (30 points) and about one and a half times the 35-point difference between *Basic* and *Proficient* performance on NAEP set for grade 4.

The number of states with standards at or above the NAEP *Basic* level also increased, from 44 in 2009 to

46 in 2011 and 47 in 2013, with five states having standards at the *Proficient* level compared with one state each in 2009 and 2011.

- In grade 8 reading, the 83-point distance between the highest and lowest proficiency standards is about twice the size of the standard deviation on the NAEP national grade 8 reading assessments (34 points) and about twice the 38-point difference between *Basic* and *Proficient* performance on NAEP set for grade 8.

The number of states with standards at or above the NAEP *Basic* level increased from 35 in 2009 and 36 in 2011 to 41 in 2013 (with one state standard in the *Proficient* range in 2013 compared with none in the previous years).

- In grade 8 mathematics, the 60-point distance separating the highest and lowest proficiency standards is about one and a half times the size of the standard deviation of the NAEP mathematics scores for public school students (36 points) and one and a half times the 37-point distance between NAEP *Basic* and *Proficient* performance set for grade 8.

Forty-one out of 49 states had standards above the *Basic* level, an increase from 39 both in 2009 and 2011; three of these state standards were also in the *Proficient* range compared with one state standard in 2009 and two in 2011.

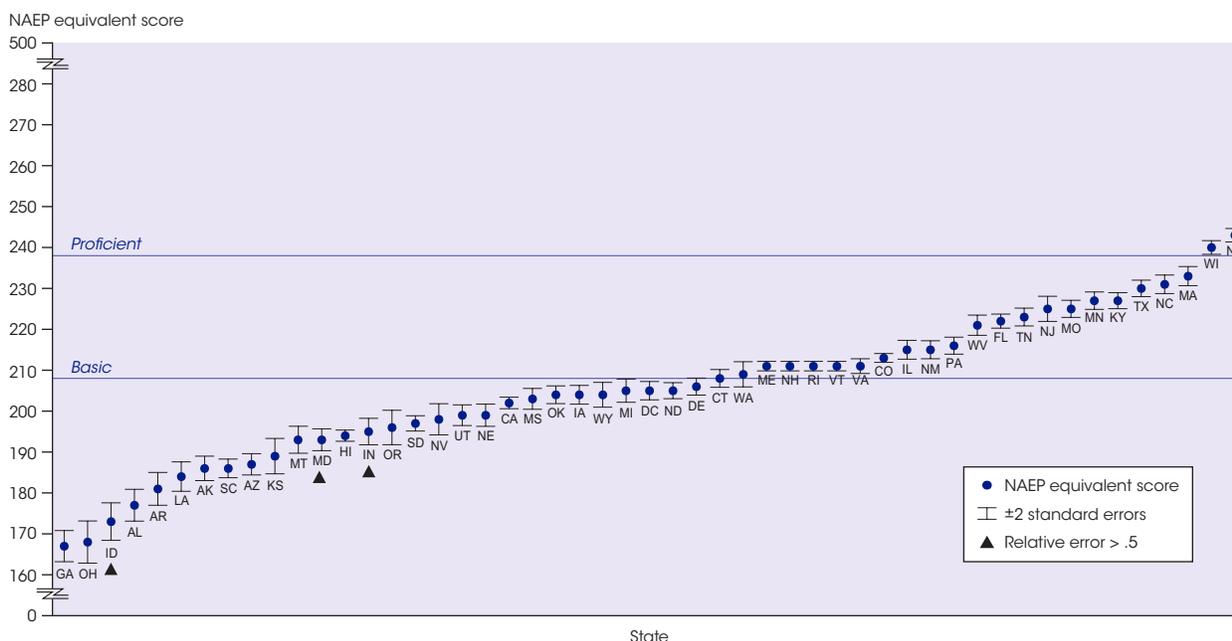
2013 Grade 4 Reading

Figure 1 shows the NAEP equivalent score for each state's grade 4 reading standard for proficient performance. The horizontal lines that run across the figure indicate the cut points for NAEP *Proficient* and *Basic* performance. The vertical line drawn through each state's NAEP equivalent score indicates the margin of error associated with the estimate. A black triangle under a state abbreviation in figure 1 indicates that the relative error associated with the NAEP equivalent of that state's standards is greater than .5 and results should be interpreted with caution.⁸

Across states, the average NAEP equivalent score was 205, below NAEP's definition of *Basic* performance (*Basic* performance is set at 208 and *Proficient* at 238).

The difference between the NAEP equivalent reading scores of the states with the lowest and highest proficiency standards, Georgia and New York, respectively, was 76 points on the NAEP 0–500 scale. This difference is about twice the size of the standard deviation on the 2013 NAEP grade 4 reading assessment (37 points) and more than twice the 30-point distance between the NAEP *Basic* and the NAEP *Proficient* standards. The range widened 11 points from 2011 and 13 points from 2009 (table 1).^{9,10}

Figure 1. NAEP scale equivalents of state grade 4 reading standards for proficient performance, by state: 2013



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading Assessment.

⁸ Although NAEP results are reported on a 0–500 point scale for different grades and subjects, they do not have the same meaning across subjects or grades. Therefore, the results shown in the figures are not comparable across grades or subjects.

⁹ The standard deviation provides an indication of how much the test scores vary. The lower the standard deviation, the closer the scores are clustered around the average score. About 95 percent of the student scores can be expected to fall within the range of two standard deviations above and two standard deviations below the average score. For example, if the average score of a data set is 250 and the standard deviation is 35, it means that approximately 95 percent of the scores fall between 180 (250 - 70) and 320 (250 +70).

¹⁰ Table C-1 of appendix C displays the standard deviations of the scores of the NAEP reading and mathematics assessments in grades 4 and 8.

Although the NAEP scale equivalents for proficient performance in some states are below the NAEP cut point for *Basic* performance (208), because of the error associated with the estimate, the NAEP scale equivalent may not be significantly different from the NAEP cut point. For example, this is the case in Connecticut, Delaware, and Michigan, as shown in figure 1.¹¹

Accounting for the margin of error, 26 of 51 states had grade 4 standards for reading proficiency that were below *Basic* performance on NAEP in 2013. Two states, New York and Wisconsin, had standards above the *Proficient* level, and the remaining states were within the *Basic* range. The number of states with standards at or above NAEP's *Basic* level increased from 15 in 2009 and 20 in 2011 to 25 in 2013 (table 2).

Table 1. The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 4 reading: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	234	235	243
Lowest	170	170	167
Range	63	65	76

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading Assessments.

Table 2. Number of states with proficiency standards for grade 4 reading classified into NAEP achievement levels: 2009, 2011, and 2013

Achievement Level	2009 ¹	2011	2013
<i>Proficient</i>	0	0	2
<i>Basic</i>	15	20	23
<i>Below Basic</i>	35	31	26
Total	50	51	51

¹ Nebraska was not included in the 2009 analysis because it did not offer a statewide assessment to report on standards.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading Assessments.

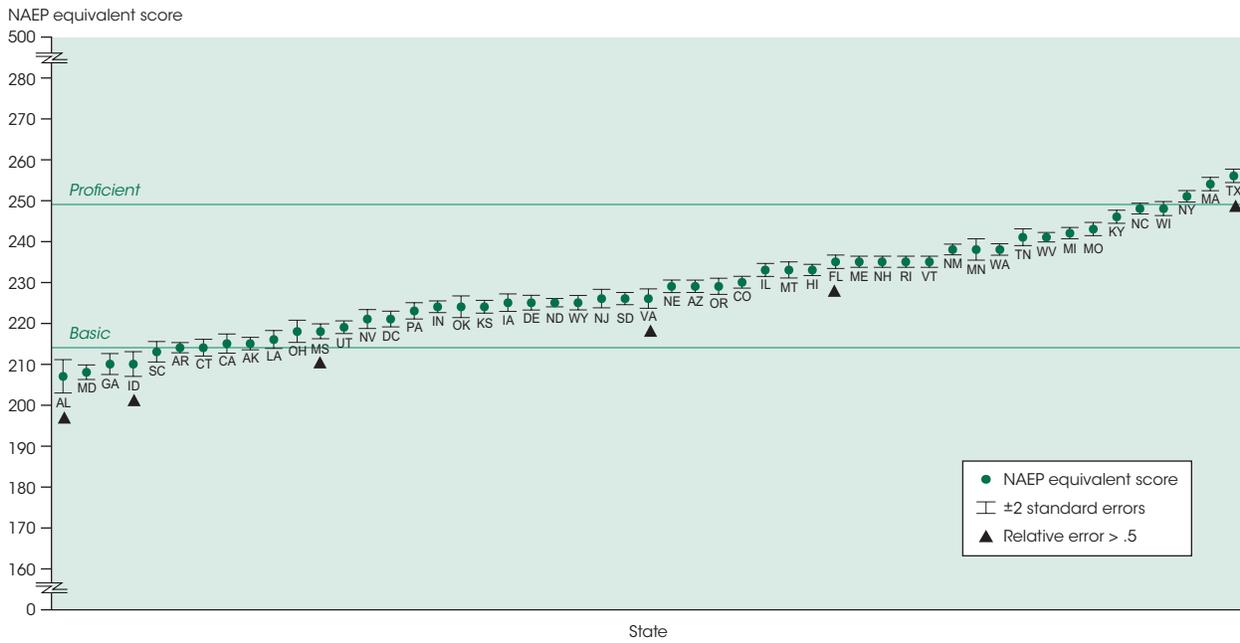
¹¹ A state is determined to be below *Basic* if its NAEP equivalent score is statistically significantly lower than the NAEP *Basic* performance cut score. A state is determined to be in the *Basic* range if its NAEP equivalent score is not measurably different from or statistically significantly higher than the NAEP *Basic* performance cut score, and its NAEP equivalent score is also statistically significantly lower than the NAEP *Proficient* performance cut score. A state is determined to be at or above *Proficient* if its NAEP equivalent score is either not measurably different from or statistically significantly higher than the NAEP *Proficient* performance cut score.

2013 Grade 4 Mathematics

Figure 2 shows the NAEP equivalent score for each state's standard for proficient performance in mathematics for grade 4, as well as markers for the NAEP *Basic* and *Proficient*

standards. For grade 4 mathematics, the NAEP cut point for *Basic* performance is 214, and the cut point for *Proficient* performance is 249. The average NAEP scale equivalent score was 229, which is within the NAEP *Basic* range.

Figure 2. NAEP scale equivalents of state grade 4 mathematics standards for proficient performance, by state: 2013



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Mathematics Assessment.

The range between the NAEP equivalent scores of the states with the lowest and highest proficiency standards, Alabama and Texas, respectively, was 49 points in 2013 (table 3). This was about one and a half times the standard deviation of the mathematics score of the nation's grade 4 public school students (30 points) and statistically significantly larger than the 35-point distance between the NAEP *Basic* and *Proficient* standards.

Four of 51 states had grade 4 standards for proficient performance below the NAEP *Basic* level in 2013, and five states had standards at or above NAEP's *Proficient* level. The remaining 42 states were in NAEP's *Basic* range. The number of states with standards for proficient performance at or above NAEP's *Basic* level increased from 44 in 2009 to 46 in 2011 and 47 in 2013 (table 4).

Table 3. The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 4 mathematics: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	255	256	256
Lowest	196	203	207
Range	59	54	49

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Mathematics Assessments.

Table 4. Number of states with proficiency standards for grade 4 mathematics classified into NAEP achievement levels: 2009, 2011, and 2013

Achievement Level	2009 ¹	2011	2013
<i>Proficient</i>	1	1	5
<i>Basic</i>	43	45	42
<i>Below Basic</i>	6	5	4
Total	50	51	51

¹ Nebraska was not included in the 2009 analysis because it did not offer a statewide assessment to report on standards.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Mathematics Assessments.

State Standards and NAEP Achievement Levels

Figure 3 shows a summary of the state proficiency standards for both reading and mathematics at grade 4 expressed in terms of NAEP achievement levels. In reading, all but two state proficiency standards (as measured by NAEP) were in the NAEP *Basic* or below *Basic* range. In mathematics,

most state standards (42 of 51) were within the *Basic* range. For 22 states, their 2013 mathematics standards were in the *Basic* range, whereas their reading standards were in the below *Basic* range. For four states, both their grade 4 reading and mathematics proficiency standards were below the *Basic* range.

Figure 3. State proficiency standards for grade 4 reading and mathematics classified into NAEP achievement levels: 2013

		Reading			Total
		Below <i>Basic</i>	<i>Basic</i>	<i>Proficient</i>	
Mathematics	<i>Proficient</i>	— 0	MA, NC, TX 3	NY, WI 2	5
	<i>Basic</i>	AK, AR, AZ, CA, DC, HI, IN, IA, KS, LA, MS, MT, NE, NV, ND, OH, OK, OR, SC, SD, UT, WY 22	CO, CT, DE, FL, IL, KY, ME, MI, MN, MO, NH, NJ, NM, PA, RI, TN, VT, VA, WA, WV 20	— 0	42
	Below <i>Basic</i>	AL, GA, ID, MD 4	— 0	— 0	4
Total		26	23	2	51

— No states in the category.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading and Mathematics Assessments.

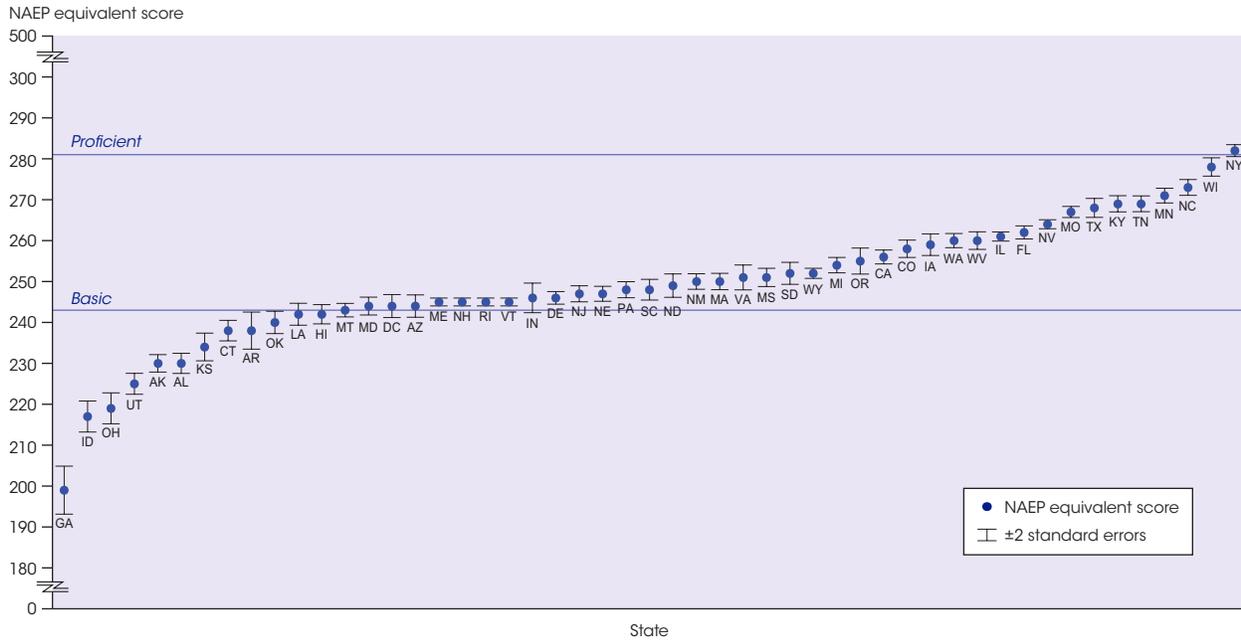
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2013 Grade 8 Reading

Figure 4 shows the NAEP scale equivalents of state performance at the proficient level in grade 8 reading. For grade 8 reading, NAEP set the cut point for *Basic* performance at 243 and for

Proficient performance at 281. The average NAEP equivalent score for state performance at the proficient level was 249, which is within the NAEP *Basic* range.

Figure 4. NAEP scale equivalents of state grade 8 reading standards for proficient performance, by state: 2013



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading Assessment.

As in grade 4 reading, in 2013 there was a wide variation between state proficiency standards in grade 8 reading: The range between the state with the lowest NAEP equivalent score, Georgia, and the highest, New York, was 83 points (table 5), which is more than twice the size of the standard deviation on the NAEP grade 8 reading assessment (34 points) and the 38-point distance between the NAEP *Basic* and *Proficient* standards. The range widened from 71 points in 2011 to 83 points in 2013 possibly due to the increase in New York's NAEP equivalent score.

Accounting for the margin of error, 10 of 51 states had grade 8 standards for proficiency that were lower than the *Basic* cut point on NAEP. The standard for one state, New York, was in the *Proficient* range on NAEP. The number of states with standards at or above NAEP's *Basic* level increased from 35 in 2009 and 36 in 2011 to 41 in 2013 (table 6).

Table 5. The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 8 reading: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	267	270	282
Lowest	199	199	199
Range	69	71	83

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading Assessments.

Table 6. Number of states with proficiency standards for grade 8 reading classified into NAEP achievement levels: 2009, 2011, and 2013

Achievement Level	2009 ¹	2011	2013
<i>Proficient</i>	0	0	1
<i>Basic</i>	35	36	40
<i>Below Basic</i>	15	15	10
Total	50	51	51

¹ Nebraska was not included in the 2009 analysis because it did not offer a statewide assessment to report on standards.

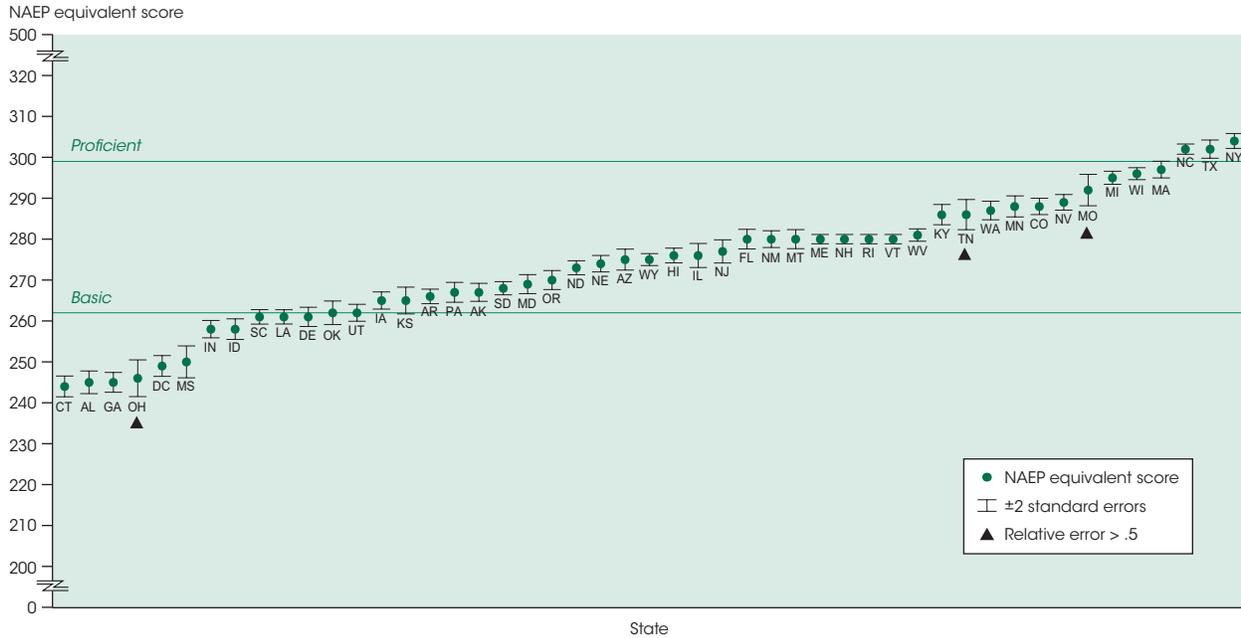
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading Assessments.

2013 Grade 8 Mathematics

For grade 8 mathematics, the NAEP cut point for performance at the *Basic* level is 262, and the cut point for performance at

the *Proficient* level is 299. The average NAEP equivalent score for state performance at the proficient level in 2013 was 274, between the NAEP standards of *Basic* and *Proficient* (figure 5).

Figure 5. NAEP scale equivalents of state grade 8 mathematics standards for proficient performance, by state: 2013



NOTE: California and Virginia were not included because the states do not assess general mathematics in grade 8.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Mathematics Assessment.

The difference between the NAEP scale equivalent mathematics scores of the states with the lowest and highest proficiency standards (Connecticut and New York, respectively, in 2013) narrowed from 71 points in 2009 to 60 points in 2013 (table 7). This 60-point difference was more than one and a half times the standard deviation of the mathematics score of the nation's grade 8 public school students (36 points) and almost twice the 37-point distance between the NAEP *Basic* and *Proficient* standards.

Table 8 shows that 41 out of 49 states had standards in 2013 at or above the *Basic* cut point, an increase from 39 in both 2009 and 2011. Three of these state standards were also above the *Proficient* cut point, compared with one state standard in 2009 and two in 2011.

Table 7. The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 8 mathematics: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	300	301	304
Lowest	229	239	244
Range	71	62	60

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Mathematics Assessments.

Table 8. Number of states with proficiency standards for grade 8 mathematics classified into NAEP achievement levels: 2009, 2011, and 2013

Achievement Level	2009	2011	2013
<i>Proficient</i>	1	2	3
<i>Basic</i>	38	37	38
<i>Below Basic</i>	9	10	8
Total	48	49	49

NOTE: Nebraska was not included in the 2009 analysis because it did not offer a statewide assessment to report on standards. California and Virginia were not included because the states do not assess general mathematics in grade 8.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Mathematics Assessments.

State Standards and NAEP Achievement Levels

The majority of states' grade 8 standards were within the NAEP *Basic* range for both reading and mathematics (figure 6). Still, five states had grade 8 proficiency standards

that were below *Basic* for both reading and mathematics. Three of these states (Alabama, Georgia, and Idaho) also had grade 4 standards that were below *Basic* for both reading and mathematics (figure 3).

Figure 6. State proficiency standards for grade 8 reading and mathematics classified into NAEP achievement levels: 2013

		Reading			Total
		Below <i>Basic</i>	<i>Basic</i>	<i>Proficient</i>	
Mathematics	<i>Proficient</i>	— 0	NC, TX 2	NY 1	3
	<i>Basic</i>	AK, AR, KS, OK, UT 5	AZ, CO, DE, FL, HI, IA, IL, KY, LA, MA, MD, ME, MI, MN, MO, MT, ND, NE, NH, NJ, NM, NV, OR, PA, RI, SC, SD, TN, VT, WA, WI, WV, WY 33	— 0	38
	Below <i>Basic</i>	AL, CT, GA, ID, OH 5	DC, IN, MS 3	— 0	8
	No Test	— 0	CA, VA 2	— 0	2
Total		10	40	1	51

— No states in the category.

NOTE: California and Virginia do not assess general mathematics in grade 8.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading and Mathematics Assessments.



Conclusion

This report shows that there continue to be wide variations in states' expectations of what students need to learn to demonstrate proficiency. Students with similar knowledge and skills in reading and mathematics but residing in different states are being evaluated against different performance standards in reading and mathematics.

In 2013, in reading, three states' proficiency standards (looking at both grades 4 and 8 combined) were in NAEP's

Proficient range; in mathematics, five states' grade 4 standards were in NAEP's *Proficient* range, as were three states' grade 8 standards. In many cases, the NAEP scale equivalent for a state standard, especially in grade 4 reading, mapped below the NAEP achievement level for *Basic* performance. There well may be valid reasons for state standards to be below NAEP's *Proficient* range. The comparisons simply provide a context for describing the expectations that states across the country have established.

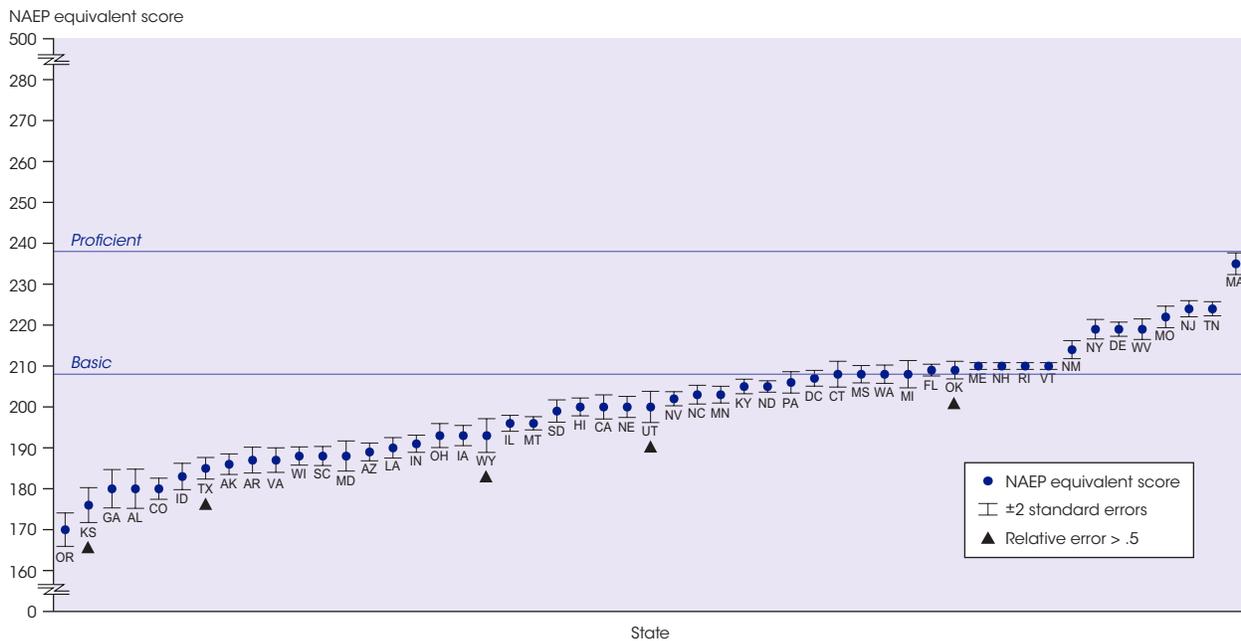
Appendix A: 2011 Mapping Results

2011 Grade 4 Reading

Figure A-1 shows the NAEP equivalent reading scores for proficient performance for each state for grade 4 in 2011, including markers for the NAEP *Basic* and *Proficient* standards and for estimates with relative error greater than .5, for which results should be interpreted with caution. The average NAEP scale equivalent score across the states was 200, below the NAEP *Basic* cut score (208).

Thirty-one of 51 states had grade 4 reading standards for proficient performance below the NAEP *Basic* level in 2011. The remaining 20 states were in NAEP's *Basic* range. The variation between the state with the lowest standard, Oregon, and the state with the highest, Massachusetts, was 65 points, about twice the 2011 grade 4 reading standard deviation of the NAEP scores of all public school students (36 points).¹²

Figure A-1. NAEP scale equivalents of state grade 4 reading standards for proficient performance, by state: 2011



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Reading Assessment.

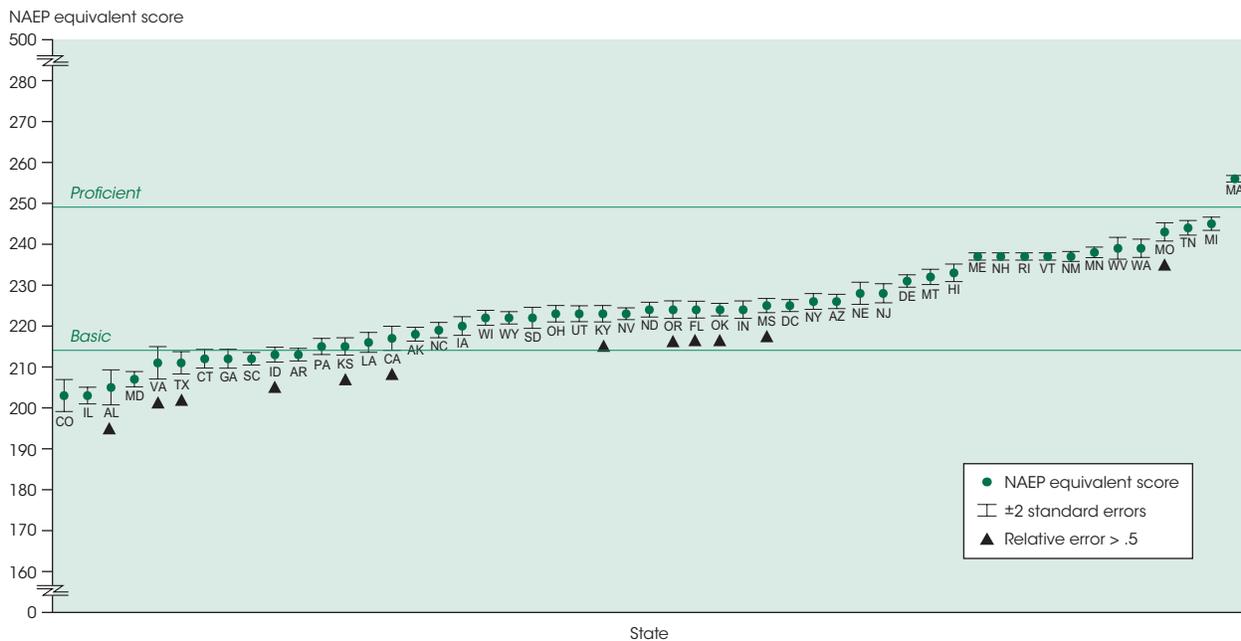
¹² Table C-1 of appendix C displays the standard deviations of the NAEP reading and mathematics assessment scores for grades 4 and 8.

2011 Grade 4 Mathematics

The average NAEP scale equivalent for proficient performance across the states in 2011 was 224, within the NAEP *Basic* range. Figure A-2 shows that five states (Colorado, Illinois, Alaska, Maryland, and South Carolina) had grade 4 standards for proficient performance below the NAEP *Basic* level (214), and one state, Massachusetts, had its standard higher than NAEP's *Proficient* level (249). The remaining 45 states were in NAEP's *Basic* range.

The variation between the states with the lowest and highest standards, Colorado and Massachusetts, respectively, was 54 points in 2011, almost twice the standard deviation of the mathematics scores of the nation's grade 4 public school students (29 points).

Figure A-2. NAEP scale equivalents of state grade 4 mathematics standards for proficient performance, by state: 2011



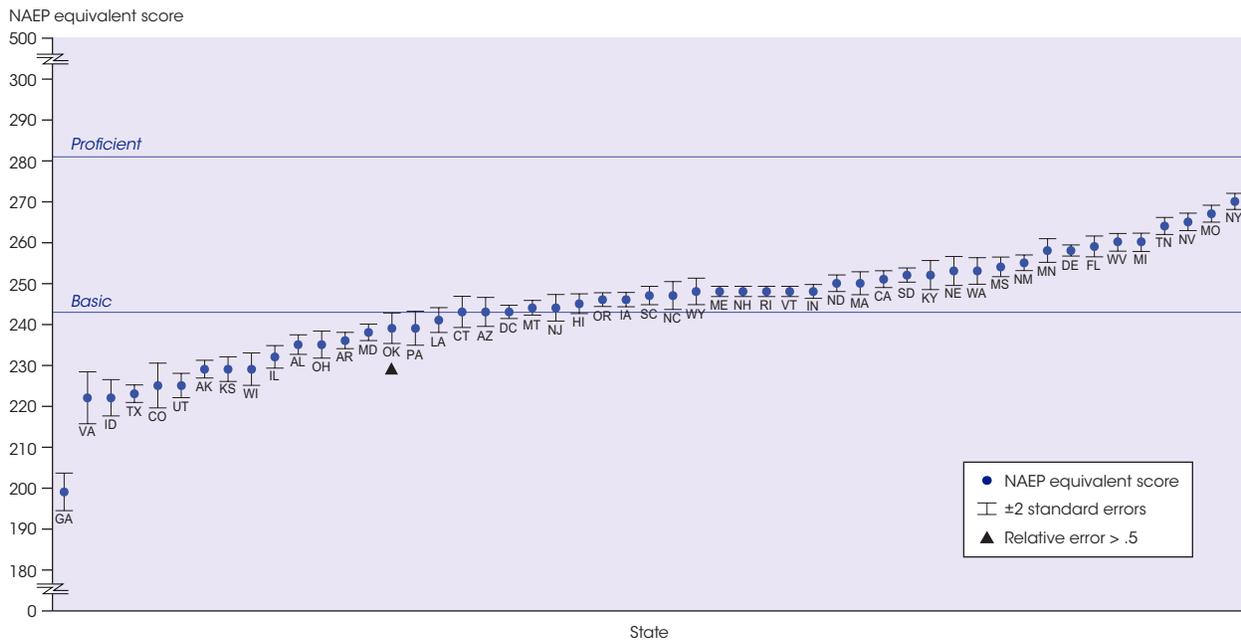
SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Mathematics Assessment.

2011 Grade 8 Reading

In 2011, the average NAEP scale equivalent for proficient performance in grade 8 reading was 244, which is within the NAEP *Basic* range. Figure A-3 shows that 15 out of 51 states had grade 8 reading standards that were lower

than *Basic* performance on NAEP. The difference between the states with the lowest and highest standards, Georgia and New York, respectively, was 71 points, about twice the standard deviation of the reading scores of the nation's grade 8 public school students (34 points).

Figure A-3. NAEP scale equivalents of state grade 8 reading standards for proficient performance, by state: 2011



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Reading Assessment.

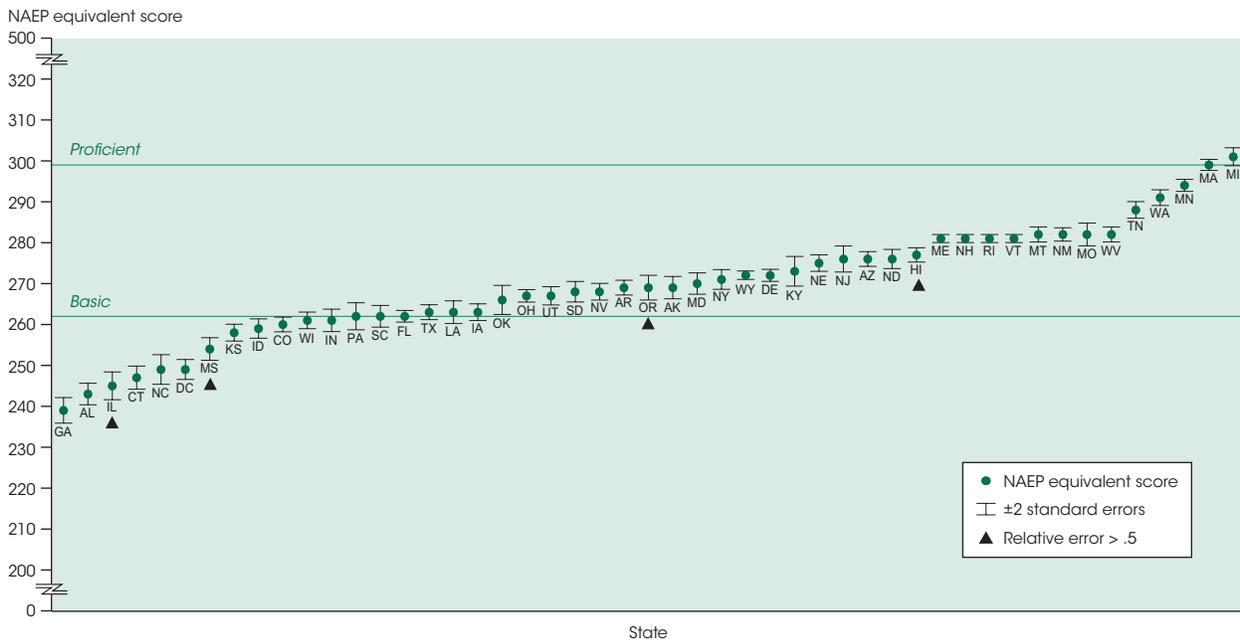
2011 Grade 8 Mathematics

For grade 8 mathematics, the NAEP cut point for performance at the *Basic* level is 262, and the cut point for performance at the *Proficient* level is 299. The average NAEP scale equivalent for proficient performance across the states was 269, between the NAEP standards of *Basic* and *Proficient*. Figure A-4 shows that 10 out of 49 states included in the analysis had grade 8 standards for proficiency in mathematics that were lower than

Basic performance on NAEP, and 2 states, Massachusetts and Michigan, had standards above NAEP's *Proficient* cut point.

The difference between the states with the lowest and highest standards, Georgia and Michigan, respectively, was 62 points, almost twice the standard deviation of the mathematics scores of the nation's grade 8 public school students (36 points).

Figure A-4. NAEP scale equivalents of state grade 8 mathematics standards for proficient performance, by state: 2011



NOTE: California and Virginia were not included because the states do not assess general mathematics in grade 8.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Mathematics Assessment.

Appendix B: Revised 2009 Mapping Results

During the verification process of the 2011 school-level student performance data collected from ED Facts, it was determined that the data ED Facts collected included the results of students who took their states' alternate assessment. Given that this is not the population of students measured by NAEP and that ED Facts was not able to separate out alternate assessment performance data, the estimates for 2009 were revised using performance data acquired directly from the states.

With few exceptions, the estimates based on the revised data are within a point of the results based on the ED Facts data. Michigan shows the largest differences because of the adoption, in 2011, of new cut scores for performance levels in the Michigan Educational Assessment Program (MEAP). These cut scores were applied retroactively to previous years for informational purposes.¹³

Estimates for Alaska and Vermont are based on fewer schools because of data suppression. In some states, the size of the comparison sample increased; in other states, it decreased by a few schools.

The correlations between the percentages reported by the state for schools and those estimated from NAEP scale equivalents are similar. The relative errors are within the same threshold.

Below are highlights of the revised 2009 mapping analyses.

Reading—Grade 4

- Michigan's NAEP equivalent score is 17 points higher than that published in the 2009 report, moving its standard into the NAEP *Basic* range.

- Pennsylvania's revised estimate moved its standards to the below *Basic* level. Although the point estimate is less than one point smaller, the error band around it also is smaller, not quite reaching the cut score for *Basic* performance.

Reading—Grade 8

- Most estimates are within a point of those based on the ED Facts data. However, Michigan's and Texas's estimates are larger by 25 and 10 points, respectively, and Georgia's is 10 points lower.
- Michigan's revised estimate moved its standard up to the NAEP *Basic* range.

Mathematics—Grade 4

- The estimate of Michigan's standards is 244 points (above NAEP *Basic*), 44 points above the previous estimate (below *Basic*).

Mathematics—Grade 8

- With the exception of Michigan (+43) and Texas (+7), most estimates are also within a point of those based on the ED Facts data.
- The increase in the Texas estimate could be associated with data from the primary administration results (i.e., no retest data are included).
- Both Texas's and Michigan's revised estimates moved their standards into the NAEP *Basic* range.

¹³ The Michigan Department of Education noted that "the state adopted more rigorous 'cut scores' for the MEAP that represented career- and college-ready achievement standards. The new cut scores have been applied operationally for the first time to these fall 2011 MEAP test results. Additionally, the MEAP results from 2008, 2009, and 2010 have been re-posted with the career- and college-ready cut scores applied retroactively to facilitate meaningful comparisons of MEAP scores across these years." See http://www.michigan.gov/documents/mde/Fall_2011_MEAP_Release_Frequently_Asked_Questions_376788_7.pdf.

Appendix C: Supporting Tables

Table C-1. Standard deviations of the NAEP reading and mathematics scores of public school students in grades 4 and 8, by year: 2009, 2011, and 2013

Year	Grade 4		Grade 8	
	Reading	Mathematics	Reading	Mathematics
2009	36	29	34	36
2011	36	29	34	36
2013	37	30	34	36

NOTE: The standard deviation represents a measure of how widely or narrowly scores are dispersed for a particular data set. If normally distributed, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score on the NAEP reading assessment for fourth-grade public school students in 2009 is 220 and the standard deviation is 36, it means that 95 percent of the scores in this data set fall between 148 and 292.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading and Mathematics Assessments.

Table C-2. Standard errors for table 1: The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 4 reading: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	0.9	1.4	0.8
Lowest	1.5	2.1	1.9
Range	1.8	2.5	2.1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading Assessments.

Table C-3. Standard errors for table 3: The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 4 mathematics: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	0.9	0.4	0.8
Lowest	1.5	2.0	2.1
Range	1.7	2.0	2.2

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Mathematics Assessments.

Table C-4. Standard errors for table 5: The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 8 reading: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	0.8	1.0	0.7
Lowest	3.9	2.3	3.0
Range	4.0	2.5	3.1

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Reading Assessments.

Table C-5. Standard errors for table 7: The highest and lowest NAEP scale equivalent scores, and the range between the highest and lowest scores, for state proficiency standards in grade 8 mathematics: 2009, 2011, and 2013

Standard	2009	2011	2013
Highest	0.9	1.1	0.9
Lowest	2.2	1.6	1.3
Range	2.4	1.9	1.6

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2009, 2011, and 2013 Mathematics Assessments.

Table C-6. Estimated NAEP scale equivalent scores, and their respective standard errors, for the state reading and mathematics proficiency standards in grade 4, by state: 2013

State	Reading		Mathematics	
	NAEP scale equivalent	Standard error	NAEP scale equivalent	Standard error
Alabama	177	2.0	207 ▲	2.1
Alaska	186	1.5	215	0.8
Arizona	187	1.3	229	0.8
Arkansas	181	2.0	214	0.6
California	202	0.7	215	1.2
Colorado	213	0.5	230	0.7
Connecticut	208	1.1	214	1.0
Delaware	206	1.1	225	0.9
District of Columbia	205	1.1	221	1.0
Florida	222	0.9	235 ▲	0.8
Georgia	167	1.9	210	1.3
Hawaii	194	0.7	233	0.7
Idaho	173 ▲	2.3	210 ▲	1.5
Illinois	215	1.2	233	0.8
Indiana	195 ▲	1.7	224	0.7
Iowa	204	1.2	225	1.1
Kansas	189	2.2	224	0.8
Kentucky	227	1.0	246	0.8
Louisiana	184	1.8	216	1.1
Maine	211	0.6	235	0.7
Maryland	193 ▲	1.4	208	0.9
Massachusetts	233	1.2	254	0.8
Michigan	205	1.4	242	0.7
Minnesota	227	1.1	238	1.3
Mississippi	203	1.3	218 ▲	0.9
Missouri	225	1.1	243	0.8
Montana	193	1.7	233	1.0
Nebraska	199	1.4	229	0.8
Nevada	198	1.9	221	1.2
New Hampshire	211	0.6	235	0.7
New Jersey	225	1.6	226	1.2
New Mexico	215	1.1	238	0.7
New York	243	0.8	251	0.7
North Carolina	231	1.2	248	0.7
North Dakota	205	1.0	225	0.5
Ohio	168	2.6	218	1.4
Oklahoma	204	1.1	224	1.4
Oregon	196	2.1	229	1.0
Pennsylvania	216	1.1	223	1.0
Rhode Island	211	0.6	235	0.7
South Carolina	186	1.2	213	1.3
South Dakota	197	1.0	226	0.8
Tennessee	223	1.1	241	1.0
Texas	230	1.0	256 ▲	0.8
Utah	199	1.3	219	0.8
Vermont	211	0.6	235	0.7
Virginia	211	0.9	226 ▲	1.2
Washington	209	1.6	238	0.7
West Virginia	221	1.3	241	0.6
Wisconsin	240	0.9	248	0.9
Wyoming	204	1.5	225	0.9

▲ Relative error greater than .5.

NOTE: Summary tables displaying the relative error are available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading and Mathematics Assessments.

Table C-7. Estimated NAEP scale equivalent scores, and their respective standard errors, for the state reading and mathematics proficiency standards in grade 8, by state: 2013

State	Reading		Mathematics	
	NAEP scale equivalent	Standard error	NAEP scale equivalent	Standard error
Alabama	230	1.3	245	1.4
Alaska	230	1.1	267	1.1
Arizona	244	1.4	275	1.3
Arkansas	238	2.3	266	0.9
California	256	0.9	—	†
Colorado	258	1.1	288	1.0
Connecticut	238	1.3	244	1.3
Delaware	246	0.8	261	1.2
District of Columbia	244	1.4	249	1.3
Florida	262	0.8	280	1.2
Georgia	199	3.0	245	1.2
Hawaii	242	1.2	276	0.9
Idaho	217	1.9	258	1.3
Illinois	261	0.6	276	1.5
Indiana	246	1.8	258	1.1
Iowa	259	1.3	265	1.1
Kansas	234	1.7	265	1.7
Kentucky	269	1.0	286	1.3
Louisiana	242	1.4	261	0.9
Maine	245	0.5	280	0.6
Maryland	244	1.1	269	1.2
Massachusetts	250	1.0	297	1.0
Michigan	254	1.0	295	0.8
Minnesota	271	0.9	288	1.3
Mississippi	251	1.1	250	2.0
Missouri	267	0.7	292 ▲	2.0
Montana	243	0.8	280	1.2
Nebraska	247	0.9	274	1.0
Nevada	264	0.6	289	1.0
New Hampshire	245	0.5	280	0.6
New Jersey	247	1.0	277	1.4
New Mexico	250	1.0	280	1.0
New York	282	0.7	304	0.9
North Carolina	273	1.0	302	0.6
North Dakota	249	1.5	273	0.9
Ohio	219	1.9	246 ▲	2.3
Oklahoma	240	1.4	262	1.5
Oregon	255	1.6	270	1.2
Pennsylvania	248	1.0	267	1.2
Rhode Island	245	0.5	280	0.6
South Carolina	248	1.3	261	0.9
South Dakota	252	1.4	268	0.8
Tennessee	269	1.0	286 ▲	1.9
Texas	268	1.2	302	1.1
Utah	225	1.3	262	1.1
Vermont	245	0.5	280	0.6
Virginia	251	1.6	—	†
Washington	260	0.9	287	1.2
West Virginia	260	1.1	281	0.8
Wisconsin	278	1.1	296	0.7
Wyoming	252	0.6	275	0.7

— Not available. California and Virginia do not assess general mathematics in grade 8.

† Not applicable.

▲ Relative error greater than .5.

NOTE: Summary tables displaying the relative error are available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading and Mathematics Assessments.

Table C-8. Estimated NAEP scale equivalent scores, and their respective standard errors, for the state reading and mathematics proficiency standards in grade 4, by state: 2011

State	Reading		Mathematics	
	NAEP scale equivalent	Standard error	NAEP scale equivalent	Standard error
Alabama	180	2.4	205 ▲	2.2
Alaska	186	1.3	218	0.9
Arizona	189	1.1	226	0.9
Arkansas	187	1.6	213	0.8
California	200	1.5	217 ▲	1.5
Colorado	180	1.3	203	2.0
Connecticut	208	1.6	212	1.2
Delaware	219	0.9	231	0.8
District of Columbia	207	1.0	225	0.7
Florida	209	0.7	224 ▲	1.0
Georgia	180	2.4	212	1.2
Hawaii	200	1.1	233	1.1
Idaho	183	1.6	213 ▲	0.9
Illinois	196	1.0	203	1.0
Indiana	191	1.1	224	1.1
Iowa	193	1.3	220	1.2
Kansas	176 ▲	2.2	215 ▲	1.1
Kentucky	205	0.9	223 ▲	1.0
Louisiana	190	1.3	216	1.2
Maine	210	0.4	237	0.5
Maryland	188	1.9	207	1.0
Massachusetts	235	1.4	256	0.4
Michigan	208	1.7	245	0.8
Minnesota	203	1.0	238	0.7
Mississippi	208	1.1	225 ▲	0.9
Missouri	222	1.3	243 ▲	1.1
Montana	196	0.8	232	1.0
Nebraska	200	1.3	228	1.4
Nevada	202	0.9	223	0.7
New Hampshire	210	0.4	237	0.5
New Jersey	224	1.0	228	1.2
New Mexico	214	1.1	237	0.6
New York	219	1.2	226	1.0
North Carolina	203	1.2	219	1.0
North Dakota	205	0.7	224	0.9
Ohio	193	1.5	223	1.0
Oklahoma	209 ▲	1.1	224 ▲	0.8
Oregon	170	2.1	224 ▲	1.1
Pennsylvania	206	1.3	215	1.0
Rhode Island	210	0.4	237	0.5
South Carolina	188	1.2	212	0.8
South Dakota	199	1.4	222	1.3
Tennessee	224	0.9	244	0.9
Texas	185 ▲	1.3	211 ▲	1.4
Utah	200 ▲	1.9	223	1.0
Vermont	210	0.4	237	0.5
Virginia	187	1.5	211 ▲	2.0
Washington	208	1.1	239	1.1
West Virginia	219	1.3	239	1.4
Wisconsin	188	1.1	222	0.9
Wyoming	193 ▲	2.1	222	0.8

▲ Relative error greater than .5.

NOTE: Summary tables displaying the relative error are available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Reading and Mathematics Assessments.

Table C-9. Estimated NAEP scale equivalent scores, and their respective standard errors, for the state reading and mathematics proficiency standards in grade 8, by state: 2011

State	Reading		Mathematics	
	NAEP scale equivalent	Standard error	NAEP scale equivalent	Standard error
Alabama	235	1.2	243	1.3
Alaska	229	1.1	269	1.4
Arizona	243	1.8	276	0.9
Arkansas	236	1.0	269	0.9
California	251	1.0	—	†
Colorado	225	2.8	260	0.9
Connecticut	243	1.9	247	1.4
Delaware	258	0.7	272	0.8
District of Columbia	243	0.8	249	1.2
Florida	259	1.3	262	0.7
Georgia	199	2.3	239	1.6
Hawaii	245	1.2	277 ▲	0.9
Idaho	222	2.3	259	1.2
Illinois	232	1.4	245 ▲	1.7
Indiana	248	0.9	261	1.4
Iowa	246	0.9	263	1.0
Kansas	229	1.5	258	1.1
Kentucky	252	1.8	273	1.8
Louisiana	241	1.5	263	1.4
Maine	248	0.6	281	0.5
Maryland	238	1.0	270	1.3
Massachusetts	250	1.4	299	0.7
Michigan	260	1.1	301	1.1
Minnesota	258	1.5	294	0.7
Mississippi	254	1.2	254 ▲	1.4
Missouri	267	1.1	282	1.4
Montana	244	0.9	282	0.9
Nebraska	253	1.8	275	1.0
Nevada	265	1.1	268	1.0
New Hampshire	248	0.6	281	0.5
New Jersey	244	1.7	276	1.6
New Mexico	255	1.0	282	0.8
New York	270	1.0	271	1.2
North Carolina	247	1.7	249	1.8
North Dakota	250	1.0	276	1.2
Ohio	235	1.7	267	0.8
Oklahoma	239 ▲	1.9	266	1.8
Oregon	246	0.9	269 ▲	1.5
Pennsylvania	239	2.1	262	1.7
Rhode Island	248	0.6	281	0.5
South Carolina	247	1.1	262	1.4
South Dakota	252	0.9	268	1.3
Tennessee	264	1.1	288	1.0
Texas	223	1.1	263	0.9
Utah	225	1.5	267	1.1
Vermont	248	0.6	281	0.5
Virginia	222	3.2	—	†
Washington	253	1.7	291	1.0
West Virginia	260	1.1	282	0.9
Wisconsin	229	2.0	261	1.0
Wyoming	248	1.6	272	0.5

— Not available. California and Virginia do not assess general mathematics in grade 8.

† Not applicable.

▲ Relative error greater than .5.

NOTE: Summary tables displaying the relative error are available at <http://nces.ed.gov/nationsreportcard/studies/statemapping/>.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Reading and Mathematics Assessments.

Appendix D: Similarity of State Assessments and NAEP

The major assumption made for the comparison of standards is that the state assessment results are correlated with NAEP results. That is, NAEP and the state assessment must identify the same pattern of high and low achievement across schools in the state. For each subject and grade, tables D-1 and D-2 display the range of correlations between the school-level percentages meeting the state proficient standard and the percentage of the NAEP sample at or above the NAEP equivalent score in those schools in 2013 and 2011, respectively.

Across both subjects and grades, the majority of states in 2013 had a correlation of .7 or higher. For those states, both assessments identified similar patterns of achievement across schools. In reading, 78 percent of states at grade 4 and 76 percent of states at grade 8 had a correlation of .7

or higher. In mathematics, 80 percent of states at grade 4 and 73 percent of states at grade 8 had a correlation of .7 or higher.

In 2011, as shown in table D-2, the correlations were lower. In reading, 73 percent of states at grade 4 and 51 percent of states at grade 8 had a correlation of at least .7. In mathematics, 59 percent of states at grade 4 and 63 percent of states at grade 8 had a correlation of .7 or higher.

The lower correlations in some states need to be considered when interpreting the comparisons of NAEP and state assessment results. These low correlations could be the result of, for example, small enrollments in these states' schools that then could affect the reliability of results or tests that measure different knowledge areas.

Table D-1. Correlation frequencies between NAEP and state assessment school-level percentages of students meeting state proficiency standards for reading and mathematics in grades 4 and 8: 2013

Correlation range	Grade 4		Grade 8	
	Reading	Mathematics	Reading	Mathematics
Total states¹	51	51	51	49
.3 ≤ r < .4	0	0	0	1
.4 ≤ r < .5	0	0	2	0
.5 ≤ r < .6	4	4	3	2
.6 ≤ r < .7	7	6	7	10
.7 ≤ r < .8	24	28	24	16
r ≥ .8	16	13	15	20

¹ California and Virginia do not assess general mathematics in grade 8.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading and Mathematics Assessments.

Table D-2. Correlation frequencies between NAEP and state assessment school-level percentages of students meeting state proficiency standards for reading and mathematics in grades 4 and 8: 2011

Correlation range	Grade 4		Grade 8	
	Reading	Mathematics	Reading	Mathematics
Total states¹	51	51	51	49
$.3 \leq r < .4$	0	0	2	0
$.4 \leq r < .5$	1	1	3	0
$.5 \leq r < .6$	6	7	5	4
$.6 \leq r < .7$	7	13	15	14
$.7 \leq r < .8$	28	22	19	17
$r \geq .8$	9	8	7	14

¹ California and Virginia do not assess general mathematics in grade 8.

SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2011 Reading and Mathematics Assessments.

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