

TIME FOR LEARNING: An Exploratory Analysis of NAEP Data

**PREPARED FOR THE NATIONAL
ASSESSMENT GOVERNING BOARD**

By Alan Ginsburg and Naomi Chudowsky

December 2012

The authors wish to thank Lawrence Feinberg, of the Governing Board staff, for his very helpful comments and editorial suggestions.

ABSTRACT

This report uses NAEP background data to track time and learning since the mid-1990s in three areas: student absenteeism; classroom instructional time in mathematics, reading, music and the visual arts; and homework time expected by teachers.

Key report findings are:

- Students with higher rates of *monthly absenteeism* score disproportionately at the Basic or below-Basic levels of NAEP achievement for grades 4, 8 and 12. About one-quarter of below-Basic students were absent three days or more a month in 2011, which translates into missing more than five weeks of school over a year. By contrast only one-in-ten Advanced students were absent three or more days a month.

Given the strong association between student achievement and absenteeism, it is sensible for schools to focus on improving the attendance of lower-achieving students with high absenteeism rates as part of their efforts to boost academic achievement. However, the NAEP data show that there was little or no change in the percentage of students absent 3 or more days between 1994 and 2011.

- Average weekly *instructional time* is greater in reading than in mathematics. Instructional time in both subjects declines markedly from grade 4 to grade 8.
 - Mathematics and reading instructional time has increased at both grades 4 and 8 since the mid-1990s, but 40 to 50 percent of grade 8 students still spend less than five hours per week on these two core subjects.
 - At grade 8, over half the below-Basic students on NAEP achievement levels spend less than five hours a week (i.e., less than an hour a day) on mathematics instruction; about 40 percent of these lowest-achievers spend less than an hour a day on instruction in reading-language arts.
- The *frequency of instruction in music and the visual arts*—when measured by the number of times these subjects are taught at grade 8 each week—did not decline between 1994 and 2008, as some education experts have suggested.
- More *homework time* is expected by teachers at grade 8 than at grade 4, but the amounts have not changed markedly between the mid-1990s and 2011 despite the pressures from No Child Left Behind. Black and Hispanic students are expected to spend somewhat more time on homework than Whites—perhaps a response by teachers to lower average achievement—but American Indian students, also a lower scoring group, are not given more homework than White students.

It is recommended that the National Assessment Governing Board (NAGB) consider further exploratory analyses. The priority should be to report time use for individual states and urban districts participating in NAEP and for additional subjects, especially science. The additional reports could form part of a series, possibly entitled *NAEP Portraits of American Education*, which would include reports based on other background variables as well. To provide data for a comprehensive analysis of students' time for learning, NAGB should consider extending the background questionnaires to cover the length of the school day, the length of the school year, and learning-related activities beyond the regular school day, both formal and informal. Consistency of wording with the major international assessments of PIRLS, PISA, and TIMSS should also be explored.

EXECUTIVE SUMMARY¹

The NAEP student background variables provide a rich source of information to track time and learning in U.S. schools. Based on the NAEP data, this report examines the time students use for learning from three perspectives: (1) days absent from school; (2) classroom weekly instructional time in mathematics, reading, music and the visual arts; and (3) the amount of time teachers expect students to spend each day on homework.

Research indicates that the amount of time spent on learning is related to student achievement provided that the time is used to provide high-quality instruction (Aronson, et.al., 1999; Silva, 2007). The time-outcome relationship is especially strong for at-risk students (National Center on Time and Learning, 2011).

NAEP is a unique national resource in its availability of data since the mid-1990s on student achievement and time use for learning (Smith, et.al, 2012). This period covers changes that span two major federal education reforms: systemic reform under President Clinton, introduced in the 1994 *Improving America Schools Act*; and school accountability for proficiency under President Bush's 2001 *No Child Left Behind Act*.

The NAEP data have limitations as well as strengths. One drawback is that the NAEP background questionnaires do not ask about length of the school day or the number of days in the school year, so that a comprehensive picture of students' time for learning in school is not available. A second limitation is that the wording of questions on the NAEP background questionnaires frequently shifted between the mid-1990s and 2011, which limits precise tracking of how time use has changed.

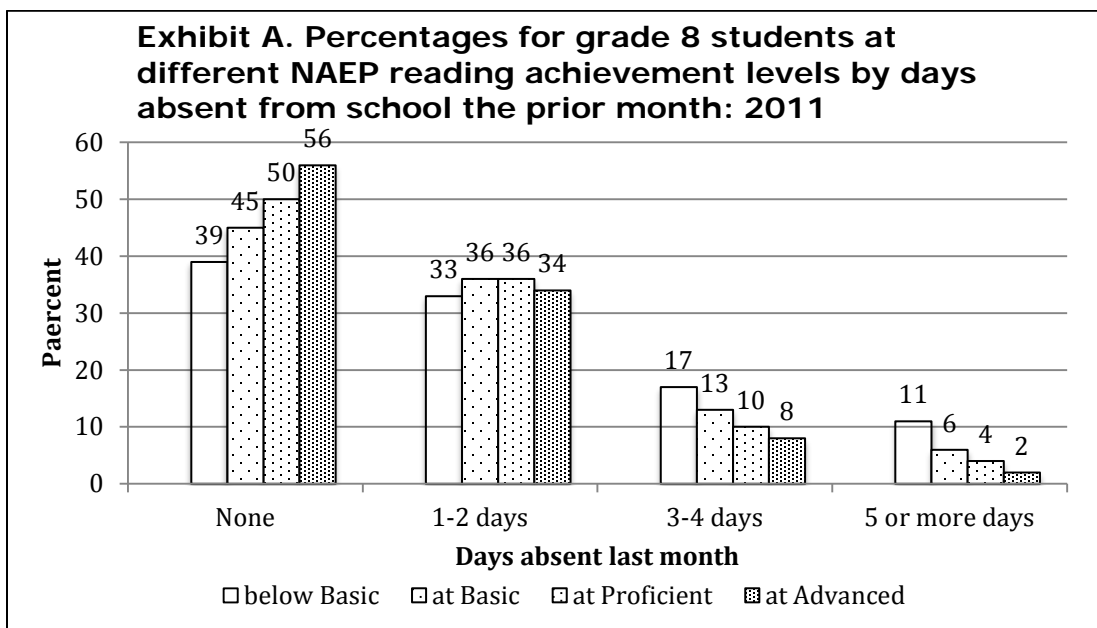
Days Absent

Teachers can't effectively teach students who are frequently absent from school. NAEP questionnaires ask students in grades 4, 8 and 12 about their days absent in the prior month with responses ranging from no days absent to five or more. To place responses in context, students absent three or more days in the prior month will, at that rate, miss at least five weeks of instruction in a school year.

Higher absenteeism and lower NAEP achievement scores are closely associated at grades 4, 8 and 12. Typical of the findings, the grade 8 results (Exhibit A) indicate that:

¹ The analyses presented in this report were made possible by the very useful NAEP Data Explorer.

- Fifty-six percent of Advanced-achieving students had perfect attendance during the prior month compared with only 39 percent of those below Basic.
- Conversely, 28 percent of the below-Basic students were absent three or more days in the prior month compared with only 10 percent of those at Advanced.



Given the strong association between student achievement and absenteeism, it is sensible for schools to focus on improving the attendance of lower-achieving students with high absenteeism rates as part of their efforts to boost academic achievement. Certainly, if children are absent from school, they may well find it more difficult to learn what is taught in their classes.

The NAEP data show, however, that there was little or no change in the percentage of students absent 3 or more days between 1994 and 2011. Despite some improvement at grade 12, about the same proportion—around one-fifth—has had such high absentee rates for almost two decades. One possible cause of the failure to make substantial improvement may be that few states track absenteeism in their public reporting of school data. A recent study found only six states that do so (Balfanz & Byrnes, 2012). The old adage “what gets measured gets done” seems to hold here. Tracking excessive absenteeism could be an important step in leading schools to focus on the problem.

The NAEP data on days absent from school in the prior month also show:

- About one-fifth of the students at grades 4, 8 and 12 were absent three or more days in the prior month (equivalent to five weeks a year).

- Perfect attendance in the prior month declines from 51 percent at grade 4 to 38 percent at grade 12, although it is not clear why students at grade 4 should be less sick.
- Private school students are somewhat less likely to be absent three or more days in the prior month than students in public school (about a 5 percentage point differential at grade 8).
- American Indian students have higher absenteeism rates than any other racial/ethnic group. For example, at eighth grade, 31 percent of American Indian students report having been absent three days or more in previous month, compared with about 20 percent of whites, blacks, and Hispanics, and only 11 percent of Asian/Pacific Islanders.
- Students eligible for free or reduced-price lunch, who are from lower-income families, are 7 percentage points more likely to be absent at least 3 days a month at grades 4 and 8 and 3 percentage points more likely at grade 12.

Instructional Time in Mathematics and Reading

Research indicates that the amount of time students spend in instruction, along with the quality of instructional time, exerts more influence on learning than the length of the school day (Silva, 2007). Given the pressures of testing to demonstrate adequate yearly progress in mathematics and reading, there is interest in knowing whether instructional time in these subjects is extended for at-risk populations and whether it has increased since the mid-1990s.

Instructional time in mathematics. This is particularly important for student learning as mathematics, unlike reading, is learned primarily at school. In examining students' time for learning mathematics, mathematics instruction is compensatory with respect to student achievement if lower achievers spend more time on mathematics each week than higher achievers.

Exhibit B. Percentages by time spent per week on math instruction at NAEP mathematics achievement levels for grades 4 and 8: 2011

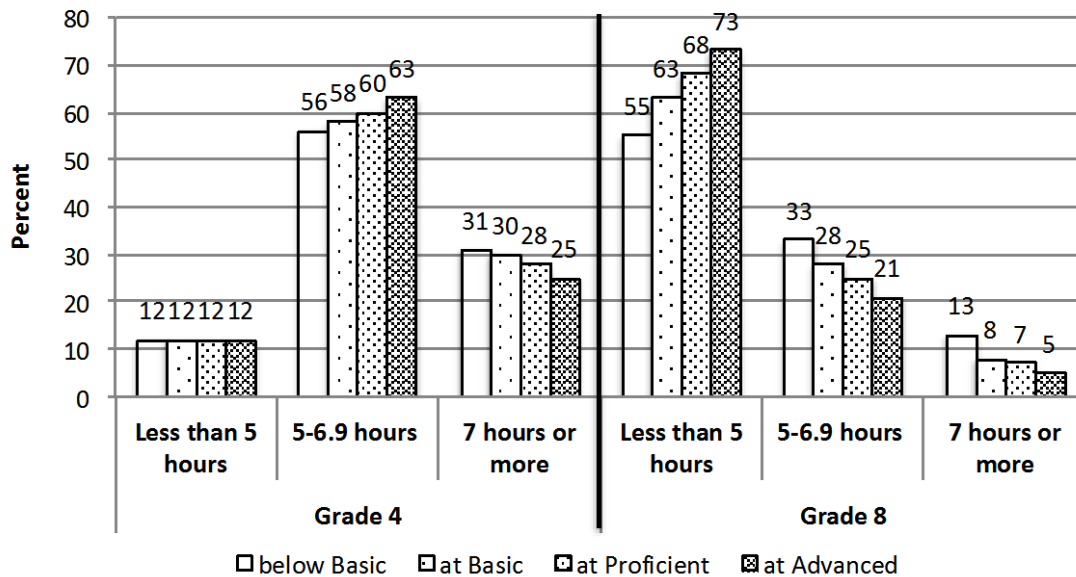


Exhibit B shows that the distribution of mathematics instructional hours is compensatory with respect to providing greater mathematics instruction to students at lower NAEP achievement levels in grades 4 and 8. Nevertheless, *a majority of grade 8 students who score below Basic, the lowest NAEP achievement category, are receiving less than an hour a day of mathematics instruction.*

- More than half (55 percent) of the below-Basic students spend less than an hour a day (5 hours a week) on mathematics instruction. Among students at Advanced 73 percent spend less than an hour a day in math classes.
- At grade 4, lower achievers are more likely to receive some additional mathematics instruction. Eighty-seven percent are spending more than five hours a week on math, including 31 percent that spend 7 hours a week or more. However, the differences across achievement levels are not large.

Other significant findings about mathematics instructional time include:

- The typical (modal) time spent in mathematics each week declines significantly between grades 4 and 8. At 4th grade, 59 percent of the students spend 5-6.9 hours per week in mathematics instruction, but at 8th grade 63 percent of students spend less than five hours a week on mathematics.

- Time spent on mathematics clearly has increased since the mid-1990s, but changes in the wording of background questions have limited NAEP's ability to report precise comparisons over time.
 - At grade 4, in 1996 about 34 percent of U.S. students spent less than four hours on mathematics each week. By 2011 only 12 percent of students spent less than five hours a week on math.
 - At grade 8, in 1996 only 33 percent of students spent four or more hours in mathematics instruction; by 2003 that had increased to 51 percent. In 2005, 31 percent of students spent five or more hours in mathematics (at least an average of an hour a day); by 2011 that had increased to 37 percent.
- Instructional time is also compensatory with respect to Black, Hispanic, and American Indian students, three student groups with lower average achievement than Whites and Asians. At grades 4 and 8, the proportion of these minority-group students spending seven hours a week or more on math instruction is between 6-12 percentage points higher than for Whites and Asians.
- Public schools provide more time for mathematics instruction than do private schools: 31 percent of the grade 4 students in public school spend seven or more hours a week on mathematics compared with only seven percent in private school, a difference of 24 percentage points. However, at grade 8 the difference narrows to only seven percentage points.
- A greater percentage of students eligible for school lunch receive 7 or more hours of mathematics instruction each week – 9 percentage points more at grade 4 and 7 points more at grade 8.

Instructional time in reading. The 2011 NAEP questionnaire asks teachers of reading about time spent on instruction in language arts – formal reading, grammar and writing. Before 2005, the NAEP questionnaires asked only for the time spent on formal reading, which excluded writing and grammar. Thus, the time comparisons NAEP can make to current practice go back only six years.

Exhibit C. Percentages of students by time spent per week on reading-language arts instruction at NAEP reading achievement levels for grades 4 and 8: 2011

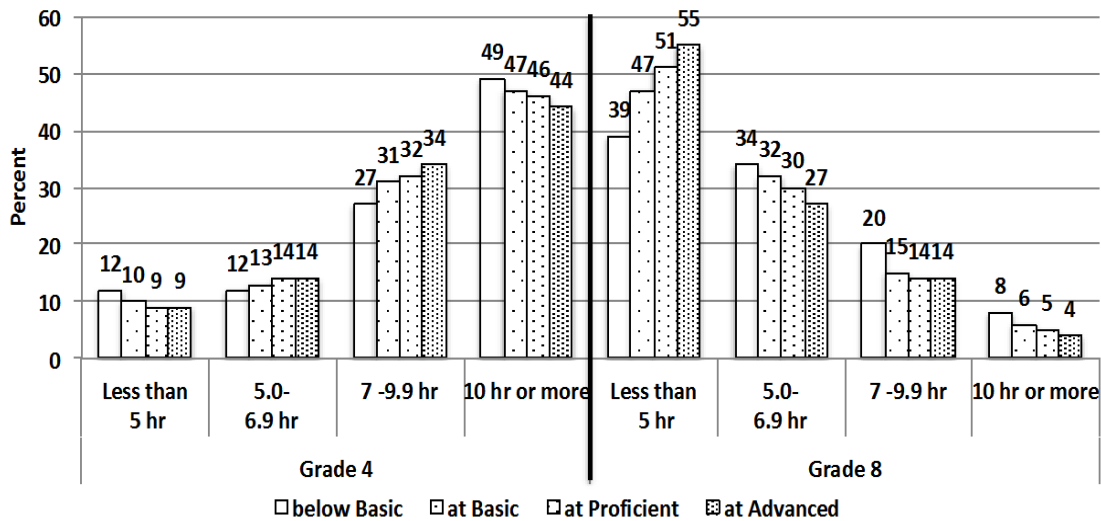


Exhibit C shows reading-language arts instructional time for students by NAEP achievement levels. It indicates that while the distribution of weekly time spent on reading is compensatory with respect to NAEP achievement levels, nonetheless:

- Time spent on reading per week declines sharply between grades 4 and 8. About 47 percent of grade 4 students on average across all achievement levels receive 10 hours or more hours of reading instruction a week—at least two hours per day. An equal 47 percent of grade 8 students on average across all achievement levels spend less than 5 hours a week on reading-language arts instruction—less than an hour a day.
- At grade 8, nearly four-in-ten below-Basic students spend less than five hours a week on instruction in reading-language arts. This is less than an hour a day for the lowest reading group. At grade 4, about 12 percent of below-basic students spend less than 5 hours a week on reading compared to 9 percent of advanced students.

Other findings on instructional time in reading-language arts include:

- The change in time spent on reading instruction at grade 4 was minimal between 2005 and 2011. At grade 8, where NAEP has a longer time series, there was a

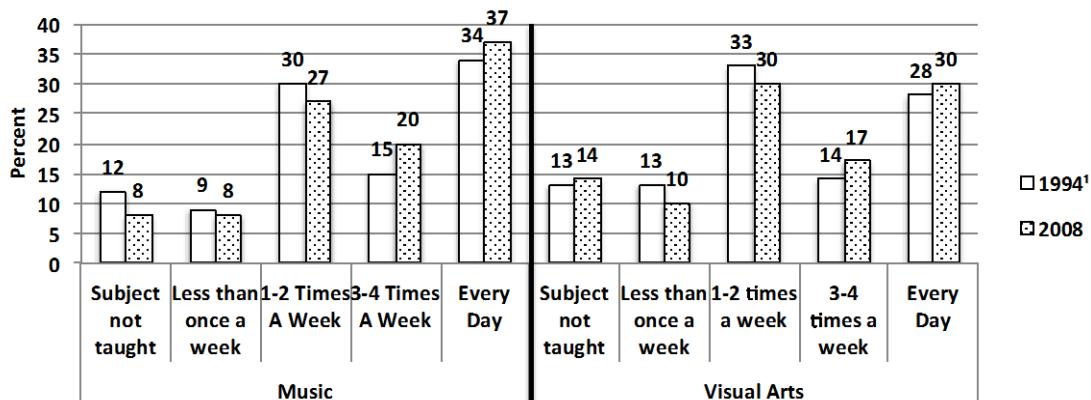
modest increase from 2002 to 2011—about 10 percentage points in students receiving more than an hour of instruction a day.

- At grade 4 the patterns of time spent on reading instruction are similar for all racial/ethnic groups except Hispanics, who receive significantly more time than whites. At grade 8, blacks and Hispanics—but not American Indians—spend more time on reading instruction than do whites and Asians.
- At grade 4 almost half of public school students receive more than 10 hours of reading-language arts instruction per week, compared with just 22 percent of those in private school. The public-private school differences are much less at eighth grade.
- The pattern of reading instruction for school-lunch eligible students at grade 4 is similar to that for students from higher-income families, but at grade 8 school-lunch eligible students are 9 percentage points more likely to receive 7 or more hours per week of reading instruction.

Frequency of Music and Visual Arts Instruction

Music and visual arts are essential elements of a K-12 curriculum. Because these subjects are not covered by federal requirements for annual testing, there are concerns they may be de-emphasized in the current curriculum. Although some retrospective studies suggest a decline in music and visual arts exposure since No Child Left Behind was enacted in 2001, a recent NCES Fast Response Survey (Parsad & Spiegelman, 2012) found that schools offering at least some music and the visual arts had not decreased between 1998 -2010.

Exhibit D. The percentages of grade 8 students nationally by the frequency of instruction in music and visual arts: 2008 & 1994



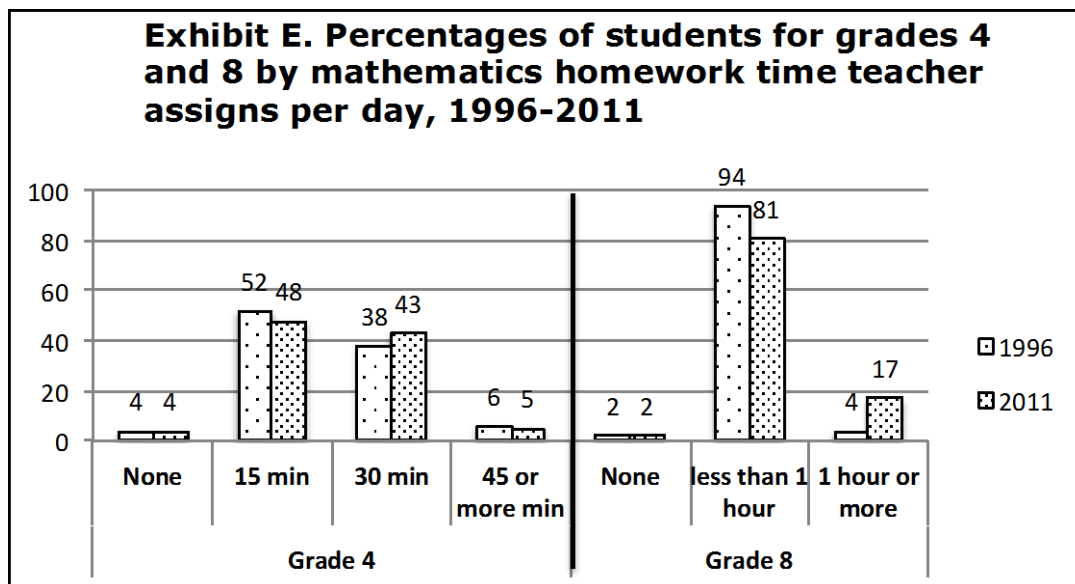
The NAEP data findings are similar, as shown in Exhibit D. Moreover, the NAEP data go beyond the information from the Fast Response Survey in that they compare the frequency of instructional offerings during the week, not just whether music and the visual arts are offered.

- The frequencies of weekly offerings in music and the visual arts have not declined between 1994 and 2008 at grade 8 (the level surveyed by NAEP).
- In fact, NAEP reports an increase from 49 percent to 57 percent in the proportion of eighth grade students receiving instruction in music at least 3 times a week.

The data also show that exposure to music and art is similar across racial/ethnic groups. Public school students receive more instruction in the arts than their peers in private school. School-lunch eligible and ineligible students experience similar patterns of frequency of music exposure, but 8 percentage points fewer school-lunch eligible students receive at least some classes in visual art.

Expected Homework Time

Given the pressures to meet No Child Left Behind improvement requirements, it might seem likely that the time teachers expect students to spend on homework would increase over the last decade. NAEP asked similar questions from 1996 to 2011 about homework time in mathematics, but it has included no questions about homework time in reading.



The results shown in Exhibit E indicate that the change in homework time between 1996 and 2011 in mathematics differed at grades 4 and 8:

- At grade 4 the expected time students would spend on mathematics homework was quite similar between 1996 and 2011. Most students were expected to spend 15-30 minutes daily on mathematics homework in both years.
- By contrast, grade 8 students with heavy mathematics homework assignments—one hour or more a day—rose from 4 to 17 percent.

The 2011 results show two other differences in expected mathematics homework:

- At both grades 4 and 8, private school students are expected to do somewhat more homework each day than public school students. The difference at grade 4 is small, but at grade 8, about 25 percent of private school students are expected to spend an hour or more a day on math homework compared with only 16 percent of public school students.
- Across racial/ethnic groups, American Indians, despite low average achievement, have the lowest amount of homework time at grades 4 and 8 along with Whites (whose average achievement is considerably higher).
- More grade 4 students eligible for school lunch receive higher amounts of homework than students who are ineligible, but at grade 8 the pattern of expected homework time is similar for both groups.

Recommendations for Further Analyses and Improvements in the Data

This report has examined at the national level three important aspects of student time and learning: absenteeism; instructional time in mathematics, reading, music and visual art; and the time expected for homework. Recommendations in three areas are proposed for consideration.

1. Two additional analyses on time for learning would be very useful:

- *Track instructional time for additional academic subjects, possibly to be presented in separate reports.* Science would be a high priority for an additional report because of wide public interest in this field and the federal requirement for annual student assessments.
- *Disaggregate and display selected key indicators of time use for individual states and participating urban districts* so these jurisdictions can compare their use of time for learning. Such reporting should be part of an online compendium of key background indicators for states and participating urban districts, as proposed in

recommendation 4b of the Expert Panel Report to NAGB on Strengthening NAEP Background Questions (Smith et al., 2012).

2. *The Governing Board should consider establishing a series of **NAEP Portraits of American Education**.* The series could be initiated by the time and learning analyses along with the exploratory study of NAEP data on charter schools, which has also been prepared for the Governing Board. The series could then cover other sets of background variables such as those for teachers, curriculum, technology, private schools and students' out-of-school learning.
3. Our experiences in preparing this report have prompted several methodological suggestions to improve future analyses of NAEP background information:
 - *Consider adding questions to the school questionnaire on the length of the school day and school year so that a more comprehensive picture of student time for learning in school is available.* In particular, there is considerable interest in learning more about the length of the school day. For example, the National Center on Time and Learning (2012) in partnership with the Ford Foundation has announced a five-state time collaborative to support expanded learning time in schools. Yet, currently basic data are not available on the distribution of the length of the school day across American schools.
 - *Consider adding to the teacher or school survey a question on whether academic performance is used to assign students to more instructional time in a particular subject.* This question would address an important possible reason for instructional time differences.
 - *Consider adding questions to the student questionnaire on time spent in out-of-school learning situations—including formal classes or tutoring, visits to museums and historic sites, cultural programs, and online activities related to learning.* While currently after-school learning situations consist mostly of formal tutoring and other organized activities, the rapid expansion of online learning will make it increasingly important to have a good picture of how students spend their time learning outside the regular school day. Indeed, educators are widely discussing the flipped classroom— primarily delivering instruction electronically and doing additional tutoring or homework activities in school. NAEP could provide important information on these out-of-school learning trends.
 - *When considering the wording of the time-for-learning questions, examine consistency with the wording of similar questions on the major international assessments of PIRLS, PISA and TIMSS.* Also, consider consistency in wording over time, as proposed in recommendation 1d of the Expert Panel Report on Background Questions (Smith et al., 2012). It might also be desirable to have consistent wording of the questions in different subjects. For example, the

questions about music and the visual arts have asked about the frequency of instruction each week, but not about the amount of instructional time, which is asked—with different time intervals—about instruction in mathematics and reading. Consistent wording would improve time-use comparisons across subjects. However, some of these goals may be conflicting, and careful judgments should be made about which type of consistency is most important.

- *Further improve the powerful online tools for NAEP data analysis.* (Recommendation 4e of the Expert Panel Report.) In particular, software should be extended to build in the capability for multivariate analysis.

TIME FOR LEARNING

Introduction

This report explores the NAEP background variables for students' time for learning covering the period from the mid 1990's to 2011. Student variables describing educational time-use are examined in three topic areas of: student days absent from school; classroom instructional time in mathematics, reading, music and the visual arts; and amount of time teachers expect students to spend on homework.

Research consistently finds that exposure to high-quality instructional time that engages students in learning improves student achievement (Aronson, et.al., 1999; Silva, 2007). Thus, time students spend in instruction and on homework, along with the quality of that instructional time and homework, are key elements of students' opportunity-to-learn to achieve to high academic standards. This connection between time and learning is particularly strong for students who are most at-risk of school failure (Dobbie and Fryer 2011; National Center on Time and Learning, 2011).

The National Center on Time and Learning (<http://www.timeandlearning.org/>) clarifies the underlying theory of why greater amounts of time use, provided that it is of high-quality, can improve student learning include

- “Longer classes allow teachers to cover: more material and examine topics in greater depth; build-in more project-based and hands-on learning; individualize and differentiate instruction; and answer students' questions.
- Setting aside whole periods each day to focus on small-group instruction to address and overcome student learning deficits.
- With more time, schools do not have to cut back class time in science, social studies, music, art and physical education in order to give more time to the heavily tested subjects of English Language Arts and math.”

This report takes advantage of NAEP's unique national resource as a repeated national survey on student achievement and student background variables (Smith et al., 2012). Using the student background variables, the report will explore days absent from school and classroom instructional time for students at different NAEP achievement levels, attending public or private schools, and by race/ethnicity or school lunch eligibility (which is an indicator of low-income status).

Along with information on time use for reading and mathematics, NAEP is also unique in its collection of national information on other academic subjects. These include music and the visual arts, which some educators believe are being neglected as schools focus on the state-assessed subjects of mathematics and reading.

The NAEP data are also a unique national resource in that they administer the background questions on time use since the mid-1990s. Over this period, the NAEP student time and

learning data span the introduction of two major pieces of legislation: systemic reform under President Clinton's 1994 Improving the America Schools Act (103 Congress), and school accountability for student proficiency required under President Bush's 2001 No child Left Behind Act (PL 107-110).

An important technical challenge in analyzing the NAEP data over time is that questions with different wording have been asked about time use on the same topic in different years. Whatever the rationale for individual question wording in a particular year, the changes in wording have disrupted the time series. As a result, the value of NAEP has been diminished for making consistent comparisons about student time use since the mid-1990s.

This report employs several techniques for analyzing the available data over time, so that the information value of these historical data is not lost. One approach is to consolidate responses presented in several shorter time-reporting intervals (e.g., less than 2 hours, 2 to less than 4 hours of reading) into longer intervals that better match-up across different time periods (e.g., less than 4 hours of reading). A second approach is to separately report how students' time-use has changed only across the years for which the questions have common wording.

The following sections of the report describe four sets of variables related to time and learning:

1. Days absent from school
2. Classroom instructional time in federally-required assessed subjects of reading and mathematics
3. Frequency of classroom instruction in music and the visual arts, which are not covered under federal assessment requirements
4. Teacher-expected homework time

Each set of students' time-related variables for school are described in terms of their 2011 national values for all students on the NAEP assessment and by how the 2011 values compare with the values from earlier years. The 2011 values for the time variables are then disaggregated to display their distribution by student characteristics including students' NAEP achievement levels, public or private school enrollment, race/ethnicity and school-lunch eligibility.

It is important to note that this report is descriptive and does not make direct causal connections between the time-use variables and student outcomes. Instead, causal interpretations on the importance of the observed time differences should come from information developed through rigorous causal research employing experimental or quasi-experimental methods.

1. Days Absent from School

A solid body of research has identified harmful consequences associated with decreased school attendance (Gottfried). Students who are excessively absent are exposed to less classroom instruction and performance declines on exams in the same year (Chen & Stevenson, 1995; Nichols, 2003). Consistently low attendance over several years in the early grades is associated with later problems of non-promotion and dropping out (Neild & Balfanz, 2006). Poor attendance is also associated with increased alienation among peers (Gottfried, Finn, Johnson),

harmful behaviors including illegal drug use (Wang, Blomberg & Li, 2005), and greater unemployment (Alexander, et.al, 1997).

Between 1994 and 2011, NAEP asked two almost identical student-reported questions about the frequency of their days absent from school:

- For 2002-2011: How many days were you absent from school last month?
Responses: None, 1-2 days, 3-4 days, 5 -10 days, More than 10 days
- For 1994-2000: How many days of school did you miss last month?
Responses: None, 1-2 days, 3-4 days, 5 -10 days, More than 10 days

We take both questions as equivalent with the slight difference in wording not meaningfully different.

Table 1a. Percentages of students by days absent from school the last month at grades 4, 8 and 12: Reading 2011				
	None	1-2 days	3-4 days	5 or more days
	Percentage	Percentage	Percentage	Percentage
Grade 4	51	30	12	7
Grade 8	45	35	13	6
Grade 12 1/	38	39	15	8
Source: NAEP Data Explorer 1/ Grade 12 is 2009				

Looking at days absent across all students nationally in 2011, (Table 1a), perfect attendance for the month is highest at grade 4 and declines successively at grades 8 and 12. However, the proportions of students with higher rates of absenteeism (3 or more days a month or the equivalent of 5 weeks a year) remain similar across the grades:

- Perfect attendance declines over the grades from 51 percent of the students at grade 4 to 38 percent at grade 12.
- However, across all grades, about one-fifth of the students missed at least 3 days a month (3-4 or 5 or more days a month). Specifically, the higher rates of absenteeism of at least 3 days a month are 19 percent at grade 4, 19 percent at grade 8 and 23 percent at grade 12, a difference of only about 4 percent of the students.

Table 1b. Changes in the percentages of students by days absent from school the last month, grades 4, 8 and 12: Reading 1994-2011				
	None	1-2 days	3-4 days	5 or more days
Grade 4	-1	0	1	0
Grade 8	1	2	0	-3
Grade 12 1/	4	2	-2	-2
Source: NAEP Data Explorer 1/ Grade 12 is 1994-2009				

The trends in Table 1b suggest that the frequency of monthly days absent has changed very little between 1994 and 2011.

- The maximum percentage-point change in the proportion of students absent for different amounts of days between 1994 and 2009 is an increase of only 4 percentage points for students with no days absent in the prior month at grade 12. Most other changes are 2 percentage points or less.

Table 1c. Percentages of students at NAEP reading achievement levels by days absent from school in the last month for grades 4, 8 and 12: 2011				
NAEP Reading Achievement Levels	None	1-2 days	3-4 days	5 or more days
Grade 4				
below Basic	45*	30	14*	11*
at Basic	51*	30	12*	6*
at Proficient	55*	30	10*	5*
at Advanced	58	29	9	4
Grade 8				
below Basic	39*	33	17*	11*
at Basic	45*	36	13*	6*
at Proficient	50*	36	10*	4*
at Advanced	56	34	8	2
Grade 12 1/				
below Basic	34*	37*	17*	12*
at Basic	38*	39	15*	7*
at Proficient	41	41	13*	5
at Advanced	45	41	10	4
Source: NAEP Data Explorer. 1/Grade 12 is 2009				
*Significantly different from Advanced at the .05 level				

Table 1c shows that at grades 4, 8 and 12 students who score at lower NAEP achievement levels are more likely to have a greater number of monthly days absent.

- The proportion of below-Basic students having perfect attendance the prior month was 13 percentage points lower than for Advanced students at grade 4, 17 percentage points at grade 8, and 11 percentage points at grade 12.
- Conversely, the proportion of below-Basic students having 3 or more days absent (or 5 weeks a year) was 12 percentage points greater than for Advanced students at grade 4, 18 percentage points greater at grade 8, and 15 percentage points greater at grade 12.

Given the strong association between student achievement and absenteeism, it is sensible for schools to focus on improving the attendance of lower-achieving students with high absenteeism rates as part of efforts to boost academic achievement. Certainly, if children are absent from school, they may well find it more difficult to learn what is taught in their classes.

The NAEP data show, however, that there was little or no change in the percentage of students absent 3 or more days between 1994 and 2011. Despite some improvement at grade 12, about the same proportion—around one-fifth—has had such high absenteeism rates for almost two decades. One possible cause of the failure to make substantial improvement may be that few states track absenteeism in their public reporting of school data. A recent study found only six states that do so (Balfanz & Byrnes, 2012). The old adage “what gets measured gets done” seems to hold here. Tracking excessive absenteeism could be an important step in leading schools to focus on the problem.

Table 1d. Percentages of public and private school students by days absent last month at grades 4 and 8: Reading 2011								
	None		1-2 days		3-4 days		5 or more days	
	Pub	Priv	Pub	Priv	Pub	Priv	Pub	Priv
Grade 4	50*	54	30*	28	12	11	7*	6
Grade 8	45*	50	35	35	13*	11	7	4
Source: NAEP Data Explorer								
*Significantly different from private at the .05 level.								

Table 1d shows that the overall pattern of public and private school students’ absenteeism is similar, although private school students are slightly more likely to have perfect attendance the prior month at both grades 4 and 8.

- The proportion of private school students with no days absent the prior month is 4-5 percentage points greater at grades 4 and 8.

Table 1e. Percentages of students by race/ethnicity for days absent from school the last month at grades 4, 8 and 12: Reading 2011					
	Race/ethnicity	None	1-2 days	3-4 days	5 or more days
Gr 4	White	50	31	12	7
	Black	49	28*	13*	9*
	Hispanic	50	29*	13*	8*
	Asian/Pacific Islander	64*	23*	8*	5*
	American Indian/Alaska Native	39*	31	17*	12*
Gr 8	White	45	37	12	6
	Black	45	32*	15*	7*
	Hispanic	44	35*	14*	7*
	Asian/Pacific Islander	62*	27*	7*	4*
	American Indian/Alaska Native	34*	35	19*	12*
Gr 12 1/	White	36	40	15	8
	Black	39*	38*	15	8

	Hispanic	38	39	15	9
	Asian/Pacific Islander	50*	33*	11*	5*
	American Indian/Alaska Native	30	36	23*	11
Source: NAEP Data Explorer 1/ Grade 12 is 2009. *Significantly different from White at the .05 level.					

Racial/ethnic differences by number of days absent break out into three groups (Table 1e).

- American Indian/Alaskan Native students have the highest percentages falling at the upper end of the monthly absenteeism range (combined 3 or more days per month) at each grade. To illustrate, at grade 8, 31 percent of American Indian students were absent 3 or more days the prior month, 13 percentage points higher than the comparable white student percentage.
- Asians at each grade have the lowest rates of absenteeism. For example, at grade 8, 62 percent were not absent any days the prior month compared to only 45 percent of whites; and only 11 percent of Asians were absent 3 or more days the prior month compared with 18 percent for Whites.
- Whites, Blacks and Hispanic students fall in the mid-range on days absent the prior month, with the White absenteeism rate of 3 or more days somewhat lower than for Blacks and Hispanics.

Table 1f. Percentages of school-lunch eligible and ineligible students by days absent from school the last month at grades 4 and 8: Reading 2011					
	School-lunch eligibility	None	1-2 days	3-4 days	5 or more days
Grade 4	Eligible	47	30	14	9
	Ineligible	54*	30	10*	6*
Grade 8	Eligible	42	35	15	8
	Ineligible	48*	36*	11*	5*
Grade 12	Eligible	36	39	16	9
	Ineligible	38*	40	15*	7*
Source: NAEP Data Explorer *Significantly different from Eligible at the .05 level.					

School lunch eligible students have somewhat higher rates of school absenteeism, especially at grades 4 and 8 (Table 1f).

- At grades 4 and 8, school-lunch eligible students are 7 percentage points higher in the proportion of students absent 3 or more days a month compared with school-lunch ineligible students.
- At grade 12, school -lunch eligible students are only 3 percentage points greater in the proportion absent 3 or more days a month compared with school-lunch ineligible students.

2. Time Spent in Mathematics and Reading Instruction

The research literature generally finds that greater time spent on instruction improves learning, especially for at-risk students, but instructional time must be used effectively (Silva, 2007). This report focuses on the quantity of instructional time, but potentially other reports could examine NAEP background data on instructional content and practice that represent factors affecting the quality of instructional time.

The unique NAEP historical data cover changes in instructional time during enactment of two major U.S. national educational policies:

- Systemic reform passed under President Bill Clinton in the 1994 *Improve Americas Schools Act* required all states receiving federal Title I funds to develop challenging content standards in mathematics and language arts and report adequate yearly progress by school.
- The 2001 No Child Left Behind Act ushered in a new period of grade-by-grade assessments and required schools to achieve proficiency of all students in mathematics and reading by 2014.

To explore instructional time in mathematics and reading and how it has changed overtime, this section examines the following questions:

- What is the current distribution of instructional time students spend in mathematics and reading, two subjects covered under federal annual testing requirements?
- Has instructional time in these subjects increased since the 1990's and, if so, how do the increases compare after passage of the 1994 Improving America's Schools Act with changes since enactment of the 2002 No Child Left Behind Act?
- How does instructional time in the mathematics and reading compare for different types of students, including by NAEP achievement levels, public or private school enrollment, race/ethnicity and school lunch eligibility?

The following section 3 will explore whether instructional time spent on music and the visual arts, which are subjects not covered under federal testing and accountability provisions, has declined since the mid 1990's?

Mathematics Instructional Time

Because mathematics is a subject learned primarily through formal instruction, unlike reading which has a significant independent home learning component, the time spent learning mathematics at school is particularly important for students' opportunity-to-learn mathematics content.

However, analyzing the NAEP data to describe how time spent on mathematics has changed since the mid-1990s is complicated by shifts in the wording of the questions teachers are asked about instructional time in mathematics across years. These wording shifts limit the ability to make comparisons of instructional time in mathematics over different time periods. For

example, the wording of the grade 4 question about mathematics instructional time has changed three times since 1996:

- 2005-2011 grade 4 question: “How many hours of mathematics instruction do your students receive in a typical week? (teacher-reported):
Responses: Less than 3 hours, 3-4.9 hours, 5-6.9 hours, 7 hours or more”
- 2003 grade 4 question: “About how much time in total do you spend with this class on mathematics instruction in a typical week? (teacher-reported)
Responses: Less than 7 hours, 7-9.9 hours, 10-12.9 hours, 13 hours or more
- 1996-2000 grade 4 question: How much time do you spend each week on mathematics instruction with this class? (teacher-reported)
Responses: 2.5 hours or less, More than 2.5 hours but less than 4, 4 hours or more

Because the 1996-2000 intervals don’t match those for 2005-2011, the change in instructional time on mathematics for each period will be computed separately. This report also elected to discard the 2003 question because its starting interval is a very high 7 hours a week and is not comparable with the intervals in the other questions.

The grade 8 wording of the question about instructional time spent on mathematics is similar to grade 4 and is treated the same way. There is no NAEP teacher questionnaire at grade 12 so that information on instructional time is unavailable.

Table 2a. Percentages of students by weekly hours of mathematics instruction for grades 4 and 8, 2011					
Grade 4			Grade 8		
Less than 5 hrs	5.0-6.9 hrs	7 or more hrs	Less than 5 hrs	5.0-6.9 hrs	7 or more hrs
12	59	29	63	28	9
Source: NAEP Data Explorer					

Teachers of mathematics report that students spend significantly more hours per week on mathematics at grade 4 than at grade 8 (Table 2a):

- A majority of grade 4 students spend 5 -6.9 hours in math a week, but at grade 8 more than half the students spend less than 5 hours in mathematics a week.
- Moreover, the proportion of students receiving 7 or more hours of math instruction is only one-third as great at grade 8 than at grade 4.

These data on instructional time raise the possibility of increasing the time spent on mathematics instruction at grade 8 as a means to strengthen middle school mathematics. As the National Mathematics Panel (2008) has noted, math in the middle grades is particularly important in building a foundation in fractions and other concepts to prepare students for algebra in high school.

Table 2b. Changes in the percentages of students by weekly hours of mathematics instruction for grades 4 and 8, 2005-2011					
Grade 4			Grade 8		
Less than 5 hrs	5.0-6.9 hrs	7 or more hrs	Less than 5 hrs	5.0-6.9 hrs	7 or more hrs
-9*	-6*	14*	-6*	4*	2*
Source: NAEP Data Explorer					
*Significant 2005-2011 difference at the .05 level					

Table 2c. Changes in the percentages of students by weekly hours of mathematics instruction, grades 4 and 8: 1996-2000			
Grade 4		Grade 8	
Less than 4 hrs	4 or more hrs	Less than 4 hrs	4 or more hrs
-6*	6*	-18*	18*
Source: NAEP Data Explorer			
*Significant 1996-2000 difference at the .05 level			

As described above, the NAEP assessments over the last 15 years have used different respondent time intervals when asking teachers about mathematics instructional time. This necessitates displaying separately the historical responses to the questions for 2005-2011 and 1996-2000. Also as noted above, the 2003 assessment question was not compatible with either period and was discarded.

Although the time intervals cannot be directly compared, the changes indicate that time spent on mathematics has increased within both periods, although differentially by grade (Tables 2b and 2c):

- A significant increase in weekly mathematics time occurred during a 4-year NAEP assessment period 1996-2000 following the 1994 Improving America's Schools Act. The increases were especially large at grade 8 where 18 percent of the students moved from less than 4 hours a week in mathematics to 4 or more hours a week.
- The increase in weekly mathematics time continued for grade 4 between 2005-2011 with a 14-percentage point increase in the proportion of students at 7 hours of instruction or more per week. The 2005-2011 increase in mathematics time at grade 8 was smaller than at grade 4 and primarily occurred from a shift of 6 percent out of the less than 5 hours a week of instruction.

It is noteworthy that the NAEP trends indicate that increases in weekly time spent on mathematics was already occurring during the 1990's following enactment of the Improving Americas Schools Act. Increases in weekly time spent on mathematics continued during the period covering No Child Left Behind.

Table 2d. Percentages of students by weekly hours of mathematics instruction at NAEP mathematics achievement levels for grades 4 and 8, 2011

Grade 4			
NAEP achievement levels	Less than 5 hours	5-6.9 hours	7 or more hours
below Basic	12	56*	31*
at Basic	12	58*	30*
at Proficient	12	60*	28
at Advanced	12	63	25
Grade 8			
below Basic	55*	33*	13*
at Basic	63*	28*	8*
at Proficient	68*	25*	7
at Advanced	73	21	5
Source: NAEP Data Explorer			
*Significant difference from Advanced at the .05 level			

Table 2d examines how weekly time spent in mathematics instruction compares for students at the four different NAEP achievement levels. These data portray opportunity-to-learn mathematics in terms of instructional time and should not be interpreted as causally relating instructional time to learning. Indeed, instructional time may reflect achievement rather than the reverse, if lower performing students are given additional mathematics instructional time.

Overall, the distribution of instructional time in mathematics is compensatory with respect to students' mathematics achievement on NAEP, but a significant proportion of the lowest achievers still receive less than an hour of daily instruction in mathematics, particularly at grade 8.

- Students at the Basic achievement level or below are 5 to 8 percentage points more likely to receive 7 or more hours of math instruction per week at grades 4 and 8 than students at Advanced.
- *Nevertheless*, at grade 4, 12 percent of below-Basic students receive less than an average of an hour of math instruction a day, and at grade 8 the percentage receiving less than an hour of math a day increases to more than half of the students below Basic.

While the overall distribution of weekly instructional time is compensatory with respect to student achievement, these data suggest school systems should consider whether the many lowest achieving students who now receive less than an hour a day of mathematics instruction would benefit from greater exposure to mathematics teaching.

Table 2e. Public and private school percentages of students by weekly hours of mathematics instruction at grades 4 and 8: 2011						
	Grade 4			Grade 8		
	Less than 5 hrs	5.0-6.9 hrs	7 or more hrs	Less than 5 hrs	5.0-6.9 hrs	7 or more hrs
Public	10*	59	31*	62*	29*	9*
Private	35	58	7	77	21	2
Source: NAEP Data Explorer						
*Significant difference from Private at the .05 level						

Compared with students in private schools, students in public schools receive significantly greater amounts of weekly mathematics instructional time at grade 4, but the difference is much less at grade 8 (Table 2e).

- At grade 4, the percentage of public students spending 7 or more hours in mathematics a week is 24 percentage points more than for private school students.
- By grade 8, the public school percentage of students spending 7 or more hours weekly in mathematics instruction falls to 9 percent and the differential over private schools is down to 7 percentage points.

TABLE 2f. Percentages of students by weekly hours of mathematics instruction and race/ethnicity at grades 4 and 8: 2011						
	Grade 4			Grade 8		
	Less than 5 hrs	5-6.9 hrs	7 hrs or more	Less than 5 hrs	5-6.9 hrs	7 hrs or more
White	13	62	25	70	24	6
Black	10*	53*	37*	48*	37*	15*
Hispanic	11*	54*	36*	55*	33*	13*
Asian/Pacific Islander	10*	62	28	68	26	6
Amer Indian/Alaska Native	12	52*	36*	52*	35*	13*
Source: NAEP Data Explorer						
*Significant difference from White at the .05 level						

The NAEP background data indicate that students' weekly instructional time on mathematics with respect to race/ethnicity is greater for the lower achieving Black, Hispanic and American Indian students than for Whites or Asians (Table 2f).

- At grade 4, slightly more than 35 percent of Black, Hispanic and American Indian/Alaskan Native students spend 7 hours or more per week in mathematics. The corresponding percentages for White and Asian students are about 10 percentage points lower.

- While grade 8 students weekly time in mathematics displays the same general compensatory pattern as for grade 4, the Black, Hispanic and Native American advantage in mathematics instructional time is particularly large at the lowest not the highest amount of weekly instructional time. Among Whites, 70 percent spend less than 5 hours (1 hour per day) in math compared with only 48 percent of Blacks, 55 percent of Hispanics and 52 percent of American Indian/Alaskan Natives.

Table 2g. Percentages of students by weekly hours of mathematics instruction and school-lunch eligibility at grades 4 and 8: 2011						
	Grade 4			Grade 8		
	Less than 5 hrs	5-6.9 hrs	7 hrs or more	Less than 5 hrs	5-6.9 hrs	7 hrs or more
Eligible	10*	55*	35*	54*	33*	13*
Ineligible	12	63	26	70	24	6
Source: NAEP Data Explorer						
*Significant difference from Ineligible at the .05 level						

School-lunch eligible students are a significantly lower performing group on the NAEP mathematics assessment at grades 4 and 8 than school-lunch ineligible students (Table 2g). Similar to the findings for race/ethnicity, the amount of time spent in mathematics is compensatory with respect to school -lunch eligibility.

- Grade 4 school lunch eligible students have an 9-percentage point greater enrollment in instruction of 7 hours or more per week than school-lunch ineligible.
- At grade 8 the school-lunch eligible advantage is 7 percentage points, but school lunch eligible students are also 16 percentage points less likely to spend 5 or less hours per week in mathematics.

Reading Instructional Time

The NAEP background questions on students' time spent in classroom reading instruction cover two major instructional components. One component is instruction in formal reading related activities, such as phonics and reading comprehension. A second component is grammar and writing. Language arts is the more common and inclusive terminology for covering reading, grammar and writing.

Unfortunately, the NAEP historical questions in this area have at different times used both the terms reading and language arts, which causes difficulties in making meaningful comparisons over time. To illustrate the difficulties, three questions use different wording and ask different information about grade 4 instructional time in the reading area since the mid-1990s.

- 2005-2011 question: About how much time in total do you spend with this class on language arts instruction in a typical week? Language arts refers to reading, writing, literature, and related topics. (teacher-reported)

Values: Less than 3 hours, 3-4.9 hours, 5-6.9 hours, 7-9.9 hours, 10 hours or more.

- 2002-2003 question: About how much time in total do you spend with your class on language arts instruction in a typical week? (teacher-reported)
Values: Less than 7 hours, 7-9.9 hours, 10-12.9 hours, 13 hours or more
- 1998-2000 question: About how much time do you spend with this class for reading instruction on a typical day? (teacher-reported)
Values: Less than 30 minutes, 30-44 minutes, 45-59 minutes, 60-90 minutes, More than 90 minutes

The 2005-2011 grade 4 question covers the broader instructional category of language arts rather than reading and the intervals range from under 3 to 10 or more hours. By comparison, the 2002-2003 question still focuses on language arts, but the least time interval is less than 7 hours a week or an hour and 20 minutes a day. The 1998 -2000 question asks about reading not language arts and shifts the intervals to minutes.

At grade 8, 2002-2011 question covers the time students spend in language arts. Unfortunately, again, the prior year questions are not comparable as the 1998 and 1994 questions ask only about reading, not language arts.

Given these differences in questions, this report for grade 4 is limited to the 2005-2011 data and for grade 8 to the 2002-2011 data on time spent in reading-language arts.

Table 2h. Percentages of students by weekly hours of reading-language arts instruction at grades 4 and 8: 2011							
Grade 4				Grade 8			
Less than 5 hrs	5.0-6.9 hrs	7.0 – 9.9 hrs	10 hrs or more	Less than 5 hrs	5.0-6.9 hrs	7.0 – 9.9 hrs	10 hrs or more
10	13	30	47	47	32	16	6
Source: NAEP Data Explorer							

In 2011, like mathematics, students are exposed to a greater number of weekly hours in reading instruction at grade 4 than at grade 8 (Table 2h).

- Nearly half the grade 4 students spend 10 hours or more a week on reading and another 30 percent between 7 and 10 hours a week.
- By comparison, nearly half the grade 8 students spend less than 5 hours a week on reading and about one-fifth of the students spend over 7 hours.

This greater time spent on reading instruction at grade 4 may reflect the instructional time required to transition students from decoding skills to reading comprehension as well as supporting the building of foundational skills in grammar and writing.

Table 2i. Change in the percentages of students by weekly hours of reading-language arts instruction at grades 4 and 8, 2002-2011							
Grade 4: 2005-2011				Grade 8: 2002-2011			
Less than 5 hrs	5.0-6.9 hrs	7 – 9.9 hrs	10 hrs or more	Less than 5 hrs	5.0-6.9 hrs	7 – 9.9 hrs	10 hrs or more
2*	-3*	-1	3*	-10*	6*	2	3*
Source: NAEP Data Explorer							
*Significant difference in NAEP change score at the .05 level							

Because of the shifts in the wording of the NAEP questions noted above, the time period for measuring the change in the number of weekly hours devoted to reading is limited to 2005-2011 at grade 4 and 2002-2011 at grade 8 (Table 2i). Over these time periods, weekly time spent on reading held constant at grade 4, but increased somewhat at grade 8.

- At grade 4 over the period of 2005 to 2011, the distribution of weekly hours of reading instruction displayed no substantial changes.
- At grade 8 from 2002 to 2011, the proportion of students receiving less than 5 hours a week of reading instruction decreased by 10 percentage points. Much of the increase was in the next highest category (5.0-6.9 hours per week), and even with these changes, nearly half the grade 8 students still were receiving less than 5 hours per week of reading-language arts.

Table 2j. Percentages of students by weekly hours of reading-language arts instruction at NAEP reading achievement levels for grades 4 and 8, 2011				
Grade 4				
NAEP achievement levels	Less than 5 hrs	5.0-6.9 hrs	7 -9.9 hrs	10 hrs or more
below Basic	12*	12	27*	49*
at Basic	10	13	31*	47
at Proficient	9	14	32	46
at Advanced	9	14	34	44
Grade 8				
below Basic	39*	34*	20*	8*
at Basic	47*	32*	15	6*
at Proficient	51	30	14	5
at Advanced	55	27	14	4
Source: NAEP Data Explorer				
*Significant difference from Advanced at the .05 level				

Table 2j indicates that the amount of weekly reading time is compensatory in the sense that students who are at the lower NAEP achievement levels receive more reading instruction, especially at grade 8. But sizeable percentages of students who are reading at Basic or below-Basic fall into the fewest hours of weekly reading time, especially at grade 8.

- At grade 4, more than three-fourths of the students across all the achievement levels receive 7 or more hours of reading instruction a week. Time spent on reading exhibits a small compensatory pattern, as the proportion of the below-Basic reading achievement group to spending 10 hours a week in reading is 5 percentage points greater than the Advanced.
- At grade 8, reading patterns are more sharply differentiated by NAEP achievement group. The percentage of students below-Basic in reading receiving 5 or less hours of reading instruction per week is 16 percentage points less than the Advanced percentage. Also, a greater proportion of below-Basic students receive reading instruction in each of the three higher amounts of weekly time spent on reading than for Advanced students.
- However, there remain significant percentages of below-basic students receiving less than 5 hours a week of reading instruction – at grade 8 about 39 percent of the students fall into this lowest amount of weekly time spent on reading.

Table 2k. Percentages of students by weekly hours of reading-language arts instruction and public and private school attendance at grades 4 and 8: 2011								
	Grade 4				Grade 8			
	Less than 5 hrs	5.0-6.9 hrs	7 - 9.9 hrs	10 hrs or more	Less than 5 hrs	5.0-6.9 hrs	7 - 9.9 hrs	10 hrs or more
Public	9*	12*	30*	49*	46*	32*	16	6*
Private	15	27	35	22	52	26	18	4
Source: NAEP Data Explorer								
*Significant difference from Private at the .05 level								

Public school students at grade 4 experience higher weekly hours of time in reading than those in private school, but differences in weekly hours of reading instruction diminish at grade 8 (table 2k).

- Grade 4 public school teachers report about half the students receive 10 or more hours of reading instruction a week compared with only about one-fifth the private school students.
- At grade 8, public and private school students are equally likely to receive higher amounts of weekly reading instruction of 7 or more hours.

Table 2l. Percentages of students by weekly hours of reading-language arts instruction and race/ethnicity at grades 4 and 8: 2011

	Grade 4				Grade 8			
	Less than 5 hrs	5.0-6.9 hrs	7 - 9.9 hrs	10 hrs or more	Less than 5 hrs	5.0-6.9 hrs	7 - 9.9 hrs	10 hrs or more
White	9	14	33	43	52	30	14	4
Black	11*	13	29*	47*	35*	37*	20*	7*
Hispanic	12*	9*	24*	56*	39*	33	19*	9*
Asian/Pacific Islander	9	13*	31	48	51	28	13	8*
American Indian/Alaska Native	12	14	30	44	48	32	15	6

Source: NAEP Data Explorer

*Significant difference from White at the .05 level

Weekly time spent in reading instruction tends to be greater for Hispanics at grade 4 and Hispanics and Blacks at grade 8, although the pattern of the extra time differs between grades 4 and 8 (Table 2l).

- At grade 4, 13 percentage points more Hispanic students receive 10 hours a week in instruction on reading than Whites.
- At grade 8, Black and Hispanic students participate at higher rates in the 7-9.9 and 10 or more hours per week reading categories, but American Indians receive little time advantage over Whites. Also, about 15 percentage points fewer Black and Hispanic students spend less than 5 hours of weekly instruction in reading than Whites. American Indian students, although also lower scoring on NAEP achievement, are almost as likely as Whites to receive less than 5 hours of reading instruction.

Table 2m. Student percentages by weekly hours of reading-language arts instruction per week and school-lunch eligibility at grades 4 and 8: 2011

School lunch eligibility	Grade 4				Grade 8			
	Less than 5 hrs	5.0-6.9 hrs	7 - 9.9 hrs	10 hrs or more	Less than 5 hrs	5.0-6.9 hrs	7 - 9.9 hrs	10 hrs or more
Eligible	11*	11*	28*	50*	40*	34*	19*	8*
Ineligible	8	13	33	47	51	31	13	5

Source: NAEP Data Explorer

*Significant difference from Ineligible at the .05 level

The federal Title I program targets low-income children to receive more and better quality instruction in reading and other core subjects. In terms of greater time spent on reading, Table 2m suggests that reading instructional time is more compensatory at grade 8 than at grade 4.

- At grade 4, low-income children eligible for school lunch are not likely to spend more time in reading instruction than other students. About one-fifth of school lunch eligibles and ineligibles receive less than 7 hours a week. School lunch eligible students do have a 3 percent greater frequency of spending 10 or more hours in reading, but an offsetting 5 percentage point fewer are spending 7-9.9 hours.
- At grade 8, however, 11 percentage points fewer school-lunch eligible students spend less than 5 hours per week in reading. Also, 9 percentage points more school-lunch eligibles spend 7 or more hours in reading than their school-lunch ineligible peers.

3. Frequency of Visual Arts and Music Instruction

Education experts and parents interested in music and art have expressed concerns that the emphasis on mathematics and reading to meet federal test-based accountability at grades 3-8 has diminished the amount of instructional time devoted to music and the visual arts. This section examines trends in grade 8 teacher reports on the weekly frequency of music and visual arts instruction to examine the evidence supporting diminished exposure between 1994 and 2008.

The literature on trends in time spent on music and art sends conflicting signals. Some surveys (Centre on Education Policy, 2007) of school systems ask about whether time spent on music and art instruction has changed since enactment of No Child Left Behind in 2002. These surveys are typically based on retrospective data and methodologically are weaker than comparing actual times reported for different years.

The likely more accurate methodology employed by NCES (Parsad & Spiegleman, 2012) was to compare survey responses from public school staff in 1999-2000 and 2009-2010 rather than rely on retrospective recollections of instructional time. The NCES study found that the percent of public schools offering some instruction in music and the visual arts had not significantly changed in the decade spanning 2000-2010, with most schools offering both subjects.

The NAEP background variables can be used to validate the Fast Response findings. Furthermore, it provides additional information about the frequency of instruction in music and the visual arts each week. That is, the Fast Response survey only asked schools whether instruction in music and the visual arts was offered and not how frequently, but the NAEP questionnaire asked about frequency each week. For example, the music question asked in 1994 and 2008

- How often does a typical eighth-grade student in your school receive instruction in each of the following subjects? (school-reported)
Values: Every Day, 3-4 Times A Week, 1-2 Times A Week, Less than once a week, Subject not taught

Visual Arts

Table 3a. The frequency of instruction in visual arts by the percentage of grade 8 students nationally: 2008 and 1994					
Year	Subject not taught	Less than once a week	1-2 times a week	3-4 times a week	Every Day
2008	14	10	30	17	30
1994	13	13	33	14	28
Source: NAEP Data Explorer					

Despite concerns over test-based accountability in reading and math diminishing the frequency of students' exposure to the visual arts, the NAEP data indicate that the frequency of visual arts instruction per week was about the same in 2008 as in 1994 across the full range of frequencies (Table 3a).

- Using the NCES the fast-response survey criteria about whether visual arts instruction was taught at all, slightly under 15 percent of the students failed to receive any instruction in the visual arts in 1994 and 2008. This is consistent with the NCES fast-response finding that in 2010 about 17 percent of the elementary schools failed to offer visual arts instruction.
- Given that most students receive some visual arts instruction, the NAEP data go beyond the information in the Fast Response survey in that they address how often visual arts instruction is offered when it is available. Overall, the distribution of visual arts instruction across the weekly frequency levels for 2008 is quite similar to the distribution 14 years earlier. There is some evidence of a small increase in visual arts instructional time, as 47 percent of the students received at least 3 days of visual arts instruction in 2008 compared with a lessor 42 percent in 1994.

Table 3b. Percentages of public and private school students by frequency of instruction in visual arts at grade 8: 2008					
	Subject not taught	Less than once a week	1-2 times a week	3-4 times a week	Every Day
Public	13	10	26*	18	33
Private	17	10	70	--	--
Source: NAEP Data Explorer					
*Significant difference from Private at the .05 level					

Public school students are more likely than private to have frequent exposure to visual arts (Table 3b).

- Most grade 8 students in public or private school receive some visual arts instruction each week.

- About half of public school grade 8 students are exposed to visual arts 3 or more times a week, while private school students exposure is likely to be no more than only one or two times a week.

Table 3c. Percentages by racial/ethnic group and school lunch eligibility for frequency of instruction in visual arts at grade 8: 2008					
Year	Subject not taught	Less than once a week	1-2 times a week	3-4 times a week	Every Day
Race/Ethnicity ^{1/}					
White	11	11	34	17	28
Black	18	10	24	18	31
Hispanic	17	5	23	15	41
Asian Pacific	5	11	29	22	33
School Lunch					
Eligible	18	9	26	15	32
Ineligible	10	10	30	19	31
Source: NAEP Data Explorer					
1/Data for American Indian/Alaskan Natives are not available because of insufficient sample size.					
*Significant difference from White within race/ethnicity or Ineligible within school lunch at the .05 level					

With respect to students having access to any visual arts instruction, Whites and especially Asians have greater access than Blacks or Hispanics to some visual arts instruction, but among those receiving instruction, Hispanics are likely to have a greater frequency of exposure (Table 3c).

- Only 5 percent of Asian students have no exposure to the visual arts, but 18 percent of black students and 17 percent of Hispanics.
- However, Hispanics have a 13 percent higher proportion receiving daily visual arts instruction than Whites.

Notably, the proportion of school-lunch eligibles receiving no visual arts instruction is 8 percentage points higher than for students from higher -income families, who are ineligible for school lunch.

Music

Table 3d. Percentages of students by frequency of instruction in music at grade 8: 2008 and 1994					
Year	Subject not taught	Less than once a week	1-2 Times a Week	3-4 Times a Week	Every Day
2008	8	8	27	20	37
1994	12	9	30	15	34
Source: NAEP Data Explorer					

The comparison of music instruction between 1994 and 2008, as with the visual arts, shows no reduction in the frequency of music instruction offered (Table 3d). The 8 percent of students receiving no music instruction is similar to the NCES Fast Response Survey finding that 6 percent of schools did not offer any music in 2010. Indeed, the frequency of music offerings may have increased.

- There was an increase of 8 percentage points in the proportion of students receiving music 3 or more times a week.

Table 3e. Percentages of public and private school students by frequency of instruction in music at grade 8: 2008					
	Subject not taught	Less than once a week	1-2 Times a Week	3-4 Times a Week	Every Day
Public	8	7	24*	22	39
Private	10	15	71	#	3
# Rounds to zero.					
Source: NAEP Data Explorer					
*Significant difference from Private at the .05 level					

In 2008, students in public schools were more likely than in private schools to receive instruction in music multiple times a week (Table 3e).

- Most public or private school students are exposed to some music instruction.
- Sixty-one percent of public school students but only three percent of private school students receive music instruction 3 or more days a week.

Table 3f. Percentages of students by racial/ethnic group and school-lunch eligibility for frequency of music instruction at grade 8: 2008					
	Subject not taught	Less than once a week	1-2 Times a Week	3-4 Times a Week	Every Day
Race/ethnicity ^{1/}					
White	6	8	29	22	35
Black	10	8	26	18	39
Hispanic	14	6	21	16	43
Asian/Pacific Islander	7	8	25	27	34
School lunch Eligibility					
Eligible	10	6	26	21	37
Ineligible	8	8	26	21	38
Source: NAEP Data Explorer					
1/Data for American Indian/Alaskan Natives are not available because of small sample.					
*Significant difference from White within race/ethnicity or Ineligible within school lunch at the .05 level					

The frequency of exposure to music is largely unrelated to race/ethnicity or school lunch eligibility (Table 3f).

- Hispanic students are the only group that is markedly different than White students in their frequency of music instruction each week, although the direction of the difference shifts. Compared with White students, an 8 percentage point greater proportion of Hispanic students receive no music each week and also an 8 percentage point greater proportion of Hispanic students receive daily music instruction.

4. Expected Homework Time

Homework serves different purposes. Homework reinforces the content of classroom instruction. In addition, homework may be tailored to address specific student's academic needs. Students who are having difficulty in a subject can use homework to review content and provide greater practice to facilitate understanding basic concepts. Students who are more academically able may benefit from homework that stretches knowledge.

Because of differences in students' abilities, assessing the quantity of homework in terms of students' time spent on homework and its relationship with achievement may yield counter intuitive results. That is, lower achieving students may require a greater amount of time to complete the same quantity of homework than a higher achieving student, producing a negative correlation between homework time and student achievement. In fact, research that does a good job controlling for initial differences in student achievement finds that appropriate homework can exert a positive relationship on achievement, especially beyond the early elementary grades (Cooper et al., 2006).

The NAEP question about time spent on homework, asks the teacher rather than the student the amount of homework time expected. It is available only for mathematics homework. We expect that asking the teacher expected homework time should yield a measure of homework time that a student of average ability would take to complete the homework.

As an example, at grade 4, NAEP asks a consistent question between 1996 and 2011 that covers a broad range of daily homework time intervals:

Approximately how much mathematics homework do you assign to students in this class each day? (teacher-reported).

Responses: None, 15 minutes, 30 minutes, 45 minutes, 1 hour, More than 1 hour

At grade 8, the questions about time spent on homework are less satisfactory. The question for both 2009 and 2011 is:

Approximately how much mathematics homework do you assign to students in your mathematics class each day? (teacher-reported).

Responses: None, Less than 1 hour, About 1 hour, About 2-3 hours, More than 3 hours

Unlike the prior question that breaks out time into 15-minute segments up to an hour, the responses grade 8 question skips from none to less than 1 hour and it then extends to unlikely amounts just for mathematics of 2-3 or more hours daily. Thus, the grade 8 homework time analyses will be limited to identifying only very broad differences in homework time of none, less than an hour, or one hour or more.

Table 4a. Percentages of students by mathematics homework time teacher assigns per day at grades 4 and 8, 2011						
Grade 4				Grade 8		
None	15 min	30 min	45 or more min	None	Less than 1 hour	1 hour or more
4	48	43	5	2	81	17
Source: NAEP Data Explorer						

As expected, the amount of daily homework time in mathematics increases from grade 4 to grade 8 (Table 4a).

- Grade 4 mathematics homework typically centers around 15 to 30 minutes per day.
- The grade 8 question intervals, as noted, are not discriminating below an hour, but 17 percent of the grade 8 students have at least an hour of expected mathematics homework. This compares with only 5 percent of the grade 4 students having 45 minutes or more of daily mathematics homework.

Table 4b. Change in percentages of students by mathematics homework time teacher assigns per day at grades 4 and 8, 1996-2011						
Grade 4				Grade 8		
None	15 min	30 min	45 or more min	None	Less than 1 hour	1 hour or more
0	-4	5	-1	0	-13	13
Source: NAEP Data Explorer						

Given the pressures to improve student outcomes generated by systematic reform and No Child Left Behind, increases in teacher expected homework time might be anticipated between 1996 and 2011. Interestingly, expected homework time does not appear to have increased at grade 4 although increases did occur at grade 8 (Table 4b).

- At grade 4, there was no change between 1996 and 2011 in the percentage of students at the upper end of 45 minutes or more expected daily homework and there was only a modest increase of 5 percentage points of those expected to spend between 15 minutes and 30 minutes of mathematics homework daily.
- At grade 8, there was an increase of 13 percentage points in the proportion of students with expected homework time over an hour a day between 1996 and 2011.

Table 4c. Percentages of students at NAEP achievement levels by mathematics homework time teacher assigns per day at grades 4 and 8, 2011							
NAEP Achievement Levels	Grade 4				Grade 8		
	None	15 min	30 min	45 or more min	None	Less than 1 hour	1 hour or more
below Basic	5*	42*	45	8*	4*	80	17*
at Basic	4*	47*	44	6*	2*	82	16*
at Proficient	3*	50	42	4	1	81	18
at Advanced	2	52	43	4	-	80	20
Source: NAEP Data Explorer							
*Significant difference from Advanced at the .05 level							

Table 4c indicates that the expected amount of homework teachers assign does not differ much across student achievement levels. This suggests that teachers have the same expectations in terms of the amount of homework time it would take to complete typical assignments regardless of the performance levels of students in their class. It is unclear how this translates into actual assigned homework. For example, a teacher with high-performing students may expect them to do a mathematics problem in less time than a teacher with low-performing students, and hence assign the higher performers a greater quantity or more difficult problems to complete within the same time.

Table 4d. Percentages of public and private students by mathematics homework time teacher assigns per day at grades 4 and 8, 2011							
	Grade 4				Grade 8		
	None	15 min	30 min	45 or more min	None	Less than 1 hour	1 hour or more
Public	3	48	43	5	2	82	16
Private	5	41	48	6	1	74	25
Source: NAEP Data Explorer							

At both grade 4 and 8 private schools expect students to do somewhat more homework in mathematics each day than public schools (Table 4d).

- At grade 4, about 6 percentage points more private than public school students spend at least 30 minutes on homework.
- At grade 8, 9 percentage points more private school students are expected to take at least an hour to complete mathematics homework.

Table 4e shows that Black and Hispanic students are assigned more time on mathematics homework each day than Whites but not Asian students. Although American Indian students, like Blacks and Hispanics score below the NAEP average on mathematics, their expected homework time is similar to Whites and not as high as Blacks, Hispanics or Asians.

- At grade 4, 42 percent of White students are assigned at least 30 minutes of homework a day, which is considerably less than the 56 percent of Blacks, 60 percent of Hispanics and 54 percent of the Asian students. However, the 41 percent of American Indian students assigned 30 minutes or more daily on mathematics homework is no greater than on average the percentage for higher-achieving Whites.
- At grade 8, compared with White students, 6 percentage points more Black students are assigned an hour or more on homework, 8 percentage points more Hispanics and 10 percentage points more Asians. American Indians again are more similar to Whites in the percentage of students expected to spending at least an hour daily on mathematics homework.

Low-income students (eligible for school lunch) are expected to devote greater time on mathematics homework at grade 4 but expectations are more equal at grade 8.

Table 4e. Percentages of students by race/ethnicity and school-lunch eligibility for amounts of mathematics homework time teacher assigns per day at grades 4 and 8: 2011							
Race/ethnicity	Grade 4				Grade 8		
	None	15 min	30 min	45 or more min	None	Less than 1 hour	1 hour or more
White	4	54	39	3	2	84	14
Black	3*	41*	48	8*	2	78*	20*

Hispanic	2*	37*	51	9*	3	75*	22*
Asian/Pacific Islander	2*	44*	47	7*	1*	75*	24*
American Indian/Alaska Native	8*	50	37	4	6*	78*	16
School Lunch Eligibility							
Eligible	4	43*	46*	7*	3*	79*	18*
Ineligible	3	53*	41	4	1	83	15
Source: NAEP Data Explorer 1/Data for American Indian/Alaskan Natives are not available because of small sample size. *Significant difference from White within race/ethnicity or ineligible within school lunch at the .05 level							

V. Recommendations for Further Analyses and Improvements in the Data

This report has examined at the national level three important aspects of student time and learning: absenteeism; instructional time in mathematics, reading, music and visual art; and the time expected to complete homework. The following recommendations are proposed for the Governing Board to consider extending these analyses in three areas:

- Two additional analyses on time for learning are proposed for NAGB consideration.
 - Track instructional time for additional academic subjects to be presented in separate reports.* Science would be a high priority for an additional report because of wide public interest in this field and the federal requirement for annual state science assessments.
 - Disaggregate and display selected key indicators of time use for individual states and participating urban districts.* A publication of key time indicators for states and urban districts in NAEP would be of great interest to enable these jurisdictions to compare their use of time for learning against other similar jurisdictions. See recommendation 4b of the Expert Panel Report to NAGB on Strengthening NAEP Background Questions (Smith et al., 2012).
- Establish a series of NAEP Portraits of American Education.* The series could be initiated by assembling all of the time and learning analyses along with the exploratory study of NAEP data on charter schools, which has also been prepared for the Governing Board. The series could then be extended to cover other sets of background variables such as those for teachers, curriculum, technology, private schools and students' out-of-school learning.
- Our experiences in preparing this report have prompted several methodological suggestions to improve future analyses of NAEP background information:
 - Consider adding questions to the school questionnaire on the length of the school day and school year so that a more comprehensive picture of student time for learning in school is available.* In particular, there is considerable interest in learning more about the length of the school day. For example, the National Center on Time and Learning

(2012) in partnership with the Ford Foundation has announced a five-state time collaborative to support expanded learning time in schools. Yet, currently basic data are not available on the distribution of the length of the school day across American schools.

- *Consider adding to the teacher or school survey a question on whether academic performance is used to assign students to more instructional time in a particular subject.* This question would address an important possible reason for instructional time differences.
- *Consider adding questions to the student questionnaire on time spent in out-of-school learning situations*—including formal classes or tutoring, visits to museums and historic sites, cultural programs, and online activities related to learning. While currently after-school learning situations consist mostly of formal tutoring and other organized activities, the rapid expansion of online learning will make it increasingly important to have a good picture of how students spend their time learning outside the regular school day. Indeed, educators are widely discussing the flipped classroom— primarily delivering instruction electronically and doing additional tutoring or homework activities in school. NAEP could provide important information on these out-of-school learning trends.
- When considering the wording of the time-for-learning questions, *examine consistency with the wording of similar questions on the major international assessments* of PIRLS, PISA and TIMSS. Also, consider consistency in wording over time, as proposed in recommendation 1d of the Expert Panel Report on Background Questions (Smith et al., 2012). It might also be desirable to have consistent wording of the questions in different subjects. For example, the questions about music and the visual arts have asked about the frequency of instruction each week, but not about the amount of instructional time, which is asked—with different time intervals—about instruction in mathematics and reading. Consistent wording would improve time-use comparisons across subjects. However, some of these goals may be conflicting, and careful judgments should be made about which type of consistency is most important.
- *Further improve the powerful online tools for NAEP data analysis.* (Recommendation 4e of the Expert Panel Report.) In particular, software should be extended to build in the capability for multivariate analysis.

References

- Alexander, K., Entwisle, D. & Horsey, (1997) From first grade forward: early foundations of high school dropout. *Sociology of Education*, 70, 87-107.
- Aronson, J., Zimmerman, J. and Carlos, L. (1999). Improving student achievement by extending school: Is it just a matter of time? San Francisco: WestEd. (PDF). Available online November 2012: http://www.wested.org/online_pubs/po-98-02.pdf
- Balfanz, R. & Byrnes, V. (2012). Balfanz, R. and Byrnes, V. (2012) *The importance of being in school: a report on absenteeism in the nation's public schools* (Baltimore, MD: Johns Hopkins University, May 2012). Available December 2012 online: <https://getschooled.com/attendance-counts/report>.
- Center on Education Policy (2008). Jennifer McMurrer, *NCLB year 5: instructional time in elementary schools: a closer look at changes for specific subjects*. Available December 2010 online: <http://www.cep-dc.org/displayDocument.cfm?DocumentID=309>.
- Chen, C. & Stevenson, H. (1995). Motivation and mathematics achievement: a comparative study of Asian-American, Caucasian, and East Asian high school students. *Child Development*, 66, 1215-1234
- Cooper, Harris, Jorgianne. C. Robinson, and Erika A. Patall. "Does Homework Improve Academic Achievement? A Synthesis of Research, 1987–2003." *Review of Educational Research* 76 (2006): 1–62.
- Dobbie, W. and Fryer, R. Jr, (2011). "Getting Beneath the Veil of Effective Schools: Evidence from New York City," NBER Working Paper, No. 17632, (December 2011).
- Gottfried, M (2011), *The detrimental effect of missing school*, American Journal of Education, v. 117, no. 2, Feb. 2011, p. 147-182
- National Center on Time and Learning (2011). Kaplan, C. and Chan, R. *Time well spent*. Available December 2012 online: <http://www.timeandlearning.org/files/TimeWellSpent.pdf>.
- National Center on Time and Learning (2012). *Time collaborative overview*. Available December 2012 online: <http://www.timeandlearning.org/files/TIME%20Collaborative%20Overview.pdf>.
- National Mathematics Advisory Panel (2008) *Foundations for success: the final report of the national mathematics advisory panel*. U.S. Department of Education. Washington, DC. Available December 2012 online: <http://www2.ed.gov/about/bdscomm/list/mathpanel/report/final-report.pdf>.
- Neild, R. C., & Balfanz, R. (2006). *Unfulfilled promise: The dimensions and characteristics of Philadelphia's dropout crisis, 2000-2005*. Baltimore: Center for Social Organization of Schools, Johns Hopkins University.
- Nichols, J. (2003). Prediction indicators for students failing the state of Indiana high school graduation exam. *Preventing School Failure*, 47, 112-120.
- Parsad, B., and Spiegelman, M. (2012). *Arts education in public elementary and secondary schools: 1999–2000 and 2009–10* (NCES 2012–014). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Available December 2012 online: <http://nces.ed.gov/pubs2012/2012014.pdf>.
- Silva, E. (2007). *On the clock: rethinking the way schools use time*. Education Sector Reports. Available online November 2012: <http://www.educationsector.org/sites/default/files/publications/OntheClock.pdf>.
- Smith, M., Chudowsky, N., Ginsburg, A., Hauser, R., Jennings, J., and Lewis, S. (2012). *NAEP background questions: an underused national resource*. National Assessment Governing Board. Washington, DC. Available online Dec 2012: <http://www.nagb.org/content/nagb/assets/documents/publications/expert-panel-naep-bq-report.pdf>.

U.S. Congress, HR6, 103rd Congress 1994). *Improving America's schools act*. Available December 2012 online: <http://www.gpo.gov/fdsys/pkg/BILLS-103hr6enr/pdf/BILLS-103hr6enr.pdf>.

U.S. Congress, PL 107-110, 107th Congress. *No child left behind act of 2001*. Available online December 2012: <http://www2.ed.gov/policy/elsec/leg/esea02/107-110.pdf>.

Wang, X, Blomberg, T., & Li, S. (2005). Comparison of the educational deficiencies of delinquent and nondelinquent students. *Evaluation Review*, 29, 291-312.

DATA APPENDIX

Table A-1. Percentages of students for reading, grade 4, 8, and 12 by days absent from school in the last month students nationally and by achievement levels, public/private school, race/ethnicity and school-lunch eligibility year 2011, 2009 and 1994 (Source: NAEP Data Explorer)

				None		1-2 days		3-4 days		5 or more days (collapsed)	
	Year	Jurisdiction	Sub-Group	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All Students											
Grade 4	2011	National		51	(0.2)	30	(0.1)	12	(0.1)	7	(0.1)
	1994	National		52	(0.7)	30	(0.6)	11	(0.5)	7	(0.3)
Grade 8	2011	National		45	(0.2)	35	(0.2)	13	(0.1)	6	(0.1)
	1994	National		44	(0.8)	33	(0.7)	13	(0.6)	9	(0.4)
Grade 12	2009	National		38	(0.5)	39	(0.3)	15	(0.3)	8	(0.2)
	1994	National		34	(0.8)	37	(0.6)	17	(0.5)	10	(0.4)
Achievement levels - discrete											
Grade 4	2011	National	below Basic	45*	(0.4)	30	(0.3)	14*	(0.2)	11*	(0.2)
			at Basic	51*	(0.4)	30	(0.4)	12*	(0.2)	6*	(0.2)
			at Proficient	55*	(0.4)	30	(0.3)	10*	(0.3)	5*	(0.2)
			at Advanced	58	(0.7)	29	(0.6)	9	(0.5)	4	(0.3)
Grade 8	2011	National	below Basic	39*	(0.4)	33	(0.5)	17*	(0.3)	11*	(0.3)
			at Basic	45*	(0.4)	36	(0.4)	13*	(0.3)	6*	(0.2)
			at Proficient	50*	(0.4)	36	(0.4)	10*	(0.3)	4*	(0.1)
			at Advanced	56	(1.4)	34	(1.2)	8	(0.8)	2	(0.3)
Grade 12	2009	National	below Basic	34*	(0.7)	37*	(0.7)	17*	(0.6)	12*	(0.6)
			at Basic	38*	(0.7)	39	(0.6)	15*	(0.6)	7*	(0.3)
			at Proficient	41	(0.7)	41	(0.6)	13*	(0.5)	5	(0.3)
			at Advanced	45	(2.0)	41	(1.4)	10	(1.1)	4	(0.6)
*Significantly different from advanced at the .05 level											
Public/Private											
Grade 4	2011	National	Public	50*	(0.2)	30*	(0.1)	12	(0.1)	7*	(0.1)
			Private	54	(0.9)	28	(0.6)	11	(0.5)	6	(0.3)
Grade 8	2011	National	Public	45*	(0.2)	35	(0.2)	13*	(0.2)	7*	(0.1)
			Private	50	(0.7)	35	(0.5)	11	(0.5)	4	(0.3)
Grade 12	2009	National	Public	NA	NA	NA	NA	NA	NA	NA	NA
			Private	NA	NA	NA	NA	NA	NA	NA	NA
*Significantly different from private at the .05 level											
Race/Ethnicity											
Grade 4	2011	National	White	50	(0.2)	31	(0.2)	12	(0.1)	7	(0.1)
			Black	49	(0.5)	28*	(0.4)	13*	(0.3)	9*	(0.2)
			Hispanic	50	(0.5)	29*	(0.4)	13*	(0.3)	8*	(0.2)
			Asian/Pacific Islander	64*	(1.1)	23*	(0.6)	8*	(0.7)	5*	(0.3)
			Indian/Alaska Native	39*	(1.5)	31	(1.3)	17*	(1.1)	12*	(0.8)
Grade 8	2011	National	White	45	(0.3)	37	(0.3)	12	(0.2)	6	(0.1)
			Black	45	(0.5)	32*	(0.4)	15*	(0.4)	7*	(0.2)
			Hispanic	44	(0.6)	35*	(0.5)	14*	(0.4)	7*	(0.2)
			Asian/Pacific Islander	62*	(1.1)	27*	(1.0)	7*	(0.5)	4*	(0.4)
			Indian/Alaska Native	34*	(1.7)	35	(1.3)	19*	(1.5)	12*	(0.9)
Grade 12	2009	National	White	36	(0.5)	40	(0.4)	15	(0.4)	8	(0.2)
			Black	39*	(1.0)	38*	(0.8)	15	(0.5)	8	(0.5)
			Hispanic	38	(0.8)	39	(0.7)	15	(0.7)	8	(0.4)
			Asian/Pacific Islander	50*	(1.7)	33*	(1.6)	11*	(1.0)	5*	(0.5)
			Indian/Alaska Native	30	(3.9)	36	(4.0)	23*	(3.2)	11	(2.6)
*Significantly different from Whites at the .05 level											
School Lunch											
Grade 4	2011	National	Eligible	47	(0.2)	30	(0.2)	14	(0.2)	9	(0.1)
			Not eligible	54*	(0.2)	30	(0.2)	10*	(0.2)	6*	(0.1)
Grade 8	2011	National	Eligible	42	(0.3)	35	(0.3)	15	(0.2)	8	(0.2)
			Not eligible	48*	(0.3)	36*	(0.3)	11*	(0.2)	5*	(0.1)
Grade 12	2009	National	Eligible	36	(0.7)	39	(0.6)	16	(0.5)	9	(0.3)
			Not eligible	38*	(0.6)	40	(0.4)	15*	(0.4)	7*	(0.2)
*Significantly different from school-lunch eligibles at the .05 level											

Table A-2a. Percentages of students by weekly hours of mathematics instruction at grades 4, 8, and 12 by students nationally and by achievement levels, public/private school, race/ethnicity and school-lunch eligibility: 2011, 2009 and 1994 (Source NAEP Data Explorer)

				Less than 5 hours (collapsed)		5-6.9 hour		7 hours or more	
	Year	Jurisdiction	Sub-group	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All students									
Grade 4	2011	National		12*	(0.4)	59*	(0.6)	29*	(0.5)
	2005	National		21	(0.5)	65	(0.5)	15	(0.4)
Grade 8	2011	National		63*	(0.7)	28*	(0.6)	9*	(0.4)
	2005	National		69	(0.6)	24	(0.6)	7	(0.3)
*Significant difference from 2005 at .05 level									
Achievement Levels									
Grade 4	2011	National	below Basic	12	(0.7)	56*	(0.9)	31*	(0.7)
	2011	National	at Basic	12	(0.5)	58*	(0.7)	30*	(0.6)
	2011	National	at Proficient	12	(0.5)	60*	(0.7)	28	(0.6)
	2011	National	at Advanced	12	(0.8)	63	(1.2)	25	(1.2)
Grade 8	2011	National	below Basic	55*	(1.0)	33*	(0.7)	13*	(0.8)
	2011	National	at Basic	63*	(0.8)	28*	(0.7)	8*	(0.5)
	2011	National	at Proficient	68*	(0.8)	25*	(0.7)	7	(0.4)
	2011	National	at Advanced	73	(1.1)	21	(1.1)	5	(0.5)
*Significant difference from 2005 at .05 level									
Public/Private									
Grade 4	2011	National	Public	10*	(0.4)	59	(0.6)	31*	(0.5)
	2011	National	Private	35	(2.5)	58	(2.4)	7	(1.1)
Grade 8	2011	National	Public	62*	(0.7)	29*	(0.6)	9*	(0.5)
			Private	77	(1.9)	21	(1.8)	2	(0.6)
*Significant difference from Private at .05 level									
Race/Ethnicity									
Grade 4	2011	National	White	13	(0.6)	62	(0.7)	25	(0.4)
			Black	10*	(0.6)	53*	(0.9)	37*	(0.9)
			Hispanic	11*	(0.9)	54*	(1.3)	36*	(1.3)
			Asian/Pacific Islander	10*	(0.8)	62	(1.8)	28	(1.9)
			American Indian/Alaska Native	12	(1.3)	52*	(2.6)	36*	(2.4)
Grade 8	2011	National	White	70	-(0.6)	24	-(0.6)	6	-(0.3)
			Black	48*	-(1.2)	37*	-(1.0)	15*	-(0.9)
			Hispanic	55*	(1.4)	33*	(1.3)	13*	(1.1)
			Asian/Pacific Islander	68	-(2.0)	26	-(1.8)	6	-(0.6)
			American Indian/Alaska Native	52*	-(2.1)	35*	-(1.6)	13*	-(1.9)
*Significant difference from White at .05 level									
School-Lunch Eligibility									
Grade 4	2011	National	Eligible	10*	(0.5)	55*	(0.8)	35*	(0.7)
			Not eligible	12	(0.5)	63	(0.8)	26	(0.6)
Grade 8	2011	National	Eligible	54*	(0.9)	33*	(0.8)	13*	(0.7)
			Not eligible	70	(0.7)	24	(0.6)	6	(0.3)
*Significant difference from Not Eligible at .05 level									

Table A-2b. Percentages of students by weekly hours of mathematics instruction at grades 4, 8, 2000 and 1996

	Year	Jurisdiction	Less than 4 hr (collapsed)		4 hours or more	
			Percentage	Standard error	Percentage	Standard error
Grade 4	2000	National	28*	(2.0)	72*	(2.0)
	1996	National	34	(2.5)	66	(2.5)
Grade 8	2000	National	49*	(0.7)	51*	(0.7)
	1996	National	67	(2.6)	33	(2.6)

*Significant difference from 1996 at .05 level

Table A-3. Percentages of students by time per week on reading-language arts at grades 4 and 8 for students nationally and by achievement levels, public/private school, race/ethnicity and school-lunch eligibility: 2011, 2005 and 2002 (Source NAEP Data Explorer)

				Less than 5 hours (collapsed)		5-6.9 hours		7-9.9 hours		10 hours or more	
	Year	Jurisdiction	Sub-group	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All Students											
Grade 4	2011	National		10*	(0.4)	13*	(0.4)	30	(0.6)	47*	(0.8)
	2005	National		8	(0.3)	16	(0.4)	31	(0.4)	44	(0.5)
Grade 8	2011	National		47*	(0.7)	32*	(0.6)	16	(0.5)	6*	(0.3)
	2002	National		57	(1.1)	26	(0.9)	14	(0.8)	3	(0.4)
*Significant difference from earliest year at the .05 level											
Achievement Levels											
Grade 4	2011	National	below Basic	12*	(0.5)	12	(0.5)	27*	(0.7)	49*	(0.9)
			at Basic	10	(0.5)	13	(0.5)	31*	(0.7)	47	(0.9)
			at Proficient	9	(0.4)	14	(0.5)	32	(0.7)	46	(1.0)
			at Advanced	9	(0.7)	14	(0.8)	34	(1.2)	44	(1.3)
Grade 8	2011	National	below Basic	39*	-(0.8)	34*	-(0.9)	20*	-(0.8)	8*	-(0.5)
			at Basic	47*	-(0.7)	32*	-(0.7)	15	-(0.6)	6*	-(0.4)
			at Proficient	51	-(0.8)	30	-(0.7)	14	-(0.5)	5	-(0.4)
			at Advanced	55	-(1.7)	27	-(1.5)	14	-(1.2)	4	-(0.6)
*Significant difference from Advanced at the .05 level											
Public/Private											
Grade 4	2011	National	Public	9*	(0.4)	12*	(0.4)	30*	(0.6)	49*	(0.8)
			Private	15	(1.7)	27	(2.0)	35	(2.2)	22	(2.1)
Grade 8	2011	Public	National	46*	(0.7)	32*	(0.7)	16	(0.5)	6*	(0.3)
	2011	Private	National	52	(2.2)	26	(2.2)	18	(1.8)	4	(0.8)
*Significant difference from Private at the .05 level											
Race/Ethnicity											
Grade 4	2011	National	White	9	(0.4)	14	(0.5)	33	(0.7)	43	(0.8)
			Black	11	(0.6)	13	(0.8)	29*	(1.0)	47*	(1.0)
			Hispanic	12*	(0.8)	9*	(0.6)	24*	(0.8)	56*	(1.2)
			Asian/Pacific Islander	9	-(0.9)	13	(1.0)	31	(1.7)	48	(2.5)
			Indian/Alaska Native	12*	-(1.3)	14	(1.9)	30	(2.2)	44	(2.2)
Grade 8	2011	National	White	52	(0.7)	30	(0.7)	14	(0.4)	4	(0.3)
			Black	35*	(1.1)	37*	(1.2)	20*	(0.9)	7*	(0.4)
			Hispanic	39*	(1.3)	33	(1.1)	19*	(1.2)	9*	(0.9)
			Asian/Pacific Islander	51	(2.2)	28	(1.6)	13	(1.6)	8*	(1.1)
			Indian/Alaska Native	48	(2.4)	32	(2.0)	15	(1.7)	6	(0.8)
*Significant difference from White at the .05 level											
School lunch Eligible											
Grade 4	2011	National	Eligible	11*	(0.5)	11*	(0.5)	28*	(0.6)	50*	(0.9)
			Not eligible	8	(0.4)	13	(0.5)	33	(0.8)	47	(1.0)
Grade 8	2011	National	Eligible	40*	(0.8)	34*	(0.8)	19*	(0.7)	8*	(0.5)
			Not eligible	51	(0.8)	31	(0.7)	13	(0.5)	5	(0.3)
*Significant difference from Not Eligible at the .05 level											

Table A-4. Percentages of grade 8 students by frequency of instruction in visual arts nationally, public/private students' race/ethnicity and school-lunch eligibility: 2008 and 1994 (Source NAEP Data Explorer)

			Every Day		3-4 Times A Week		1-2 Times A Week		Less than once a week		Subject not taught	
Year	Jurisdiction	Subgroup	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All Students												
2008	National		30	(3.1)	17	(2.6)	30	(3.5)	10	(2.5)	14	(2.4)
1994 ¹	National		28	(3.4)	14	(2.7)	33	(3.7)	13	(2.9)	13	(2.3)
Public/Private												
2008	National	Public	33	-(3.5)	18*	-(2.8)	26*	-(3.5)	10	-(2.7)	13	-(2.4)
2008	National	Private	#	†	3	-(0.9)	70	-(10.2)	10	-(6.1)	17	-(8.2)
*Significant difference from Private at the .05 level												
Race/Ethnicity												
2008	National	White	28	(3.6)	17	(3.3)	34	(4.4)	11	(3.4)	11	(2.6)
2008	National	Black	31	(4.9)	18	(4.6)	24	(4.5)	10	(4.9)	18	(4.9)
2008	National	Hispanic	41	(6.8)	15	(3.9)	23	(4.7)	5	(2.0)	17	(4.5)
2008	National	Asian/Pacific Islander	33	(7.8)	22	(6.0)	29	(6.0)	11	(4.6)	5	(2.5)
2008	National	American Indian/Alaska Native	‡	†	‡	†	‡	†	‡	†	‡	†
*Significant difference from White at the .05 level												
School-Lunch Eligibility												
2008	National	Eligible	32	(4.0)	15	(3.1)	26	(3.7)	9	(3.2)	18	(3.4)
2008	National	Not eligible	31	(3.6)	19	(3.1)	30	(4.1)	10	(3.2)	10	(2.4)
*Significant difference from Eligible at the .05 level												

Table A-5. Percentages of grade 8 students by frequency of instruction in music nationally, public/private students' race/ethnicity and school-lunch eligibility: 2008 and 1994 (Source NAEP Data Explorer)

Year	Jurisdiction	Sub-group	Every Day		3-4 Times A Week		1-2 Times A Week		Less than once a week		Subject not taught	
			Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All Students												
2008	National		37	(3.3)	20	(2.7)	27	(3.1)	8	(2.0)	8	(2.0)
1994 ¹	National		34	(3.6)	15	(3.0)	30	(4.0)	9	(2.8)	12	(2.4)
Public/Private												
2008	National	Public	39	(3.7)	22	(2.9)	24*	(3.2)	7	(2.1)	8	(2.1)
2008	National	Private	3	†	#	†	71	(8.8)	15	(6.9)	10	(6.0)
*Significant difference from Private at the .05 level												
Race/Ethnicity												
2008	National	White	35	-(3.8)	22	-(3.2)	29	-(4.0)	8	-(2.5)	6	-(2.5)
2008	National	Black	39	-(6.7)	18	-(4.9)	26	-(5.5)	8	-(4.5)	10	-(2.9)
2008	National	Hispanic	43	-(5.4)	16	-(4.1)	21	-(4.1)	6	-(2.3)	14	-(4.3)
2008	National	Asian/Pacific Islander	34	-(6.5)	27	-(8.9)	25	-(6.6)	8	-(3.4)	7	-(4.1)
2008	National	American Indian/Alaska Native	±	†	±	†	±	†	±	†	±	†
*Significant difference from White at the .05 level												
School-lunch Eligibility												
2008	National	Eligible	37	(4.1)	21	(3.3)	26	(3.4)	6	(2.1)	10	(2.1)
2008	National	Not eligible	38	(3.9)	21	(3.0)	26	(4.0)	8	(2.6)	8	(2.6)
*Significant difference from not eligible at the .05 level												

Tqble A6a.Percentages of students at grade 8 by amount of math homework teacher assigns per day (collapsed) at grade 4 for students nationally and by acheivement levels, public/private school, race/ethnicity and school-lunch eligibility: 2011 and 1996 (Source NAEP Data Explorer)

			None		15 minutes		30 minutes		45 min or more (collapsed)	
Year	Jurisdiction	Subgroup	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All Students										
2011	National		4	(0.2)	48	(0.6)	43	(0.6)	5	(0.3)
1996	National		4	(0.8)	52	(2.4)	38	(2.3)	6	(0.9)
Achievement Levels										
2011	National	below Basic	5*	(0.4)	42*	(0.7)	45	(0.9)	8*	(0.5)
2011	National	at Basic	4*	(0.3)	47*	(0.6)	44	(0.7)	6*	(0.3)
2011	National	at Proficient	3*	(0.2)	50	(0.7)	42	(0.7)	4	(0.3)
2011	National	at Advanced	2	(0.3)	52	(1.3)	43	(1.2)	4	(0.5)
*Significant difference from Advanced at .05 level										
Public/Private										
2011	National	Public	3	(0.2)	48*	(0.6)	43	(0.6)	5	(0.3)
		Private	5	(1.0)	41	(2.5)	48	(2.6)	6	(1.0)
*Significant difference from Private at .05 level										
Race/Ethnicity										
2011	National	White	4	(0.3)	54	(0.7)	39	(0.6)	3	(0.2)
2011	National	Black	3*	(0.2)	41*	(0.8)	48*	(0.9)	8*	(0.6)
2011	National	Hispanic	2*	(0.3)	37*	(1.1)	51*	(1.1)	9*	(0.8)
2011	National	Asian/Pacific Islander	2*	(0.4)	44*	(2.1)	47*	(2.1)	7*	(0.9)
2011	National	American Indian/Alaska Native	8*	(1.0)	50	(1.8)	37	(1.8)	4	(0.7)
*Significant difference from White at .05 level										
School-lunch Eligibility										
2011	National	Eligible	4	(0.3)	43*	(0.7)	46*	(0.7)	7*	(0.4)
2011	National	Not eligible	3	(0.2)	53	(0.7)	41	(0.7)	4	(0.2)
*Significant difference from not eligible at .05 level										

Tqble A6b.Percentages of students at grade 8 by amount of math homework teacher assigns per day (collapsed) at grade 8 for students nationally and by acheivement levels, public/private school, race/ethnicity and school-lunch eligibility: 2011 and 1996 (Source NAEP Data Explorer)

			None		Less than 1 hour		1 hr or more (collapsed)	
Year	Jurisdiction	Subgroup	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
All Students								
2011	National		2	(0.2)	81	(0.5)	17	(0.4)
1996	National		2	(0.6)	94	(0.9)	4	(0.8)
Achievement Levels								
2011	National	below Basic	4*	(0.4)	80	(0.8)	17*	(0.7)
2011	National	at Basic	2*	(0.2)	82	(0.5)	16*	(0.5)
2011	National	at Proficient	1	(0.1)	81	(0.6)	18	(0.7)
2011	National	at Advanced	#	†	80	(1.1)	20	(1.1)
*Significant difference from Advanced at the .05 level								
Public/Private								
2011	National	Public	2*	(0.2)	82*	(0.5)	16*	(0.5)
2011	National	Private	1	(0.4)	74	(2.0)	25	(1.9)
*Significant difference from Private at the .05 level								
Race/Ethnicity								
2011	National	White	2	(0.2)	84	(0.5)	14	(0.4)
2011	National	Black	2	(0.2)	78*	(0.7)	20*	(0.7)
2011	National	Hispanic	3	(0.4)	75*	(1.0)	22*	(1.0)
2011	National	Asian/Pacific Islander	1*	(0.1)	75*	(1.9)	24*	(1.9)
2011	National	American Indian/Alaska Native	6*	(1.3)	78*	(1.7)	16	(1.6)
*Significant difference from White at the .05 level								
School-lunch Eligibility								
2011	National	Eligible	3*	(0.3)	79*	(0.7)	18*	(0.6)
2011	National	Not eligible	1	(0.1)	83	(0.5)	15	(0.5)
*Significant difference from Not Eligible at the .05 level								