

U.S. TIMSS and PIRLS 2011 Technical Report and User's Guide

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1. Introduction

The *U.S. TIMSS and PIRLS 2011 Technical Report and User's Guide* provides an overview of the design and implementation of the Trends in International Mathematics and Science Study (TIMSS) 2011 and the Progress in International Reading Literacy Study (PIRLS) 2011 in the United States and the nine participating benchmarking states: Alabama, California, Colorado, Connecticut, Florida, Indiana, Massachusetts, Minnesota, and North Carolina, along with information designed to facilitate access to the U.S. TIMSS and PIRLS 2011 data.

1.1 TIMSS in Brief

The Trends in International Mathematics and Science Study (TIMSS) 2011 is the fifth such study since this international comparison of student achievement was first conducted in 1995. Developed and implemented at the international level by the International Association for the Evaluation of Educational Achievement (IEA), an international organization of national research institutions and governmental research agencies, TIMSS is used to measure trends in the mathematics and science knowledge and skills of fourth- and eighth-graders.

TIMSS is designed to align broadly with mathematics and science curricula in the participating countries. The results, therefore, suggest the degree to which students have learned mathematics and science concepts and skills likely to have been taught in school. TIMSS also collects background information on students, teachers, curricula, and schools to allow cross-national comparisons of educational contexts related to student achievement. In 2011, there were 54 countries¹ and 20 other education systems (including all nine benchmarking states) that participated in TIMSS at the fourth- or eighth-grade level, or both.

A detailed treatment of TIMSS 2011 from an international perspective can be found in three reports published by the IEA and available online at <http://timssandpirls.bc.edu/timss2011/index.html>.

- TIMSS 2011 International Results in Mathematics (Mullis, Martin, Foy, & Arora, 2012);

¹In this report, “countries” are complete, independent political entities, whereas “other education systems” represent a portion of a country, nation, kingdom, or emirate or are other non-national entities (e.g., U.S. states, Canadian provinces, Flemish Belgium, and Northern Ireland).

- TIMSS 2011 International Results in Science (Martin, Mullis, Foy, & Stanco, 2012); and
- Methods and Procedures in TIMSS and PIRLS 2011 (Martin & Mullis, 2011).

A U.S. national report is available as well. It is titled *Highlights From TIMSS 2011: Mathematics and Science Achievement of U.S. Fourth- and Eighth-Grade Students in an International Context* (Provasnik et al., 2012). This report describes the performance of U.S. students relative to their peers in other education systems, changes in mathematics and science achievement since 1995, and additional details about the achievement of U.S. students nationally and in the benchmarking states that are not available in the international reports. The report is available online at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2013009>.

1.2 PIRLS in Brief

The Progress in International Reading Literacy Study (PIRLS) is an international comparative study of student achievement. PIRLS 2011 represents the third such study since PIRLS was first conducted in 2001. Developed and implemented by the International Association for the Evaluation of Educational Achievement (IEA), an international organization of national research institutions and governmental research agencies, PIRLS is used to measure the reading knowledge and skills of fourth-graders over time.

PIRLS is designed to align broadly with reading curricula in the participating education systems. The results, therefore, suggest the degree to which students have learned reading concepts and skills likely to have been taught in school. PIRLS also collects background information on students, teachers, schools, curricula, and official education policies to allow cross-national comparison of educational contexts that may be related to student achievement. In 2011, there were 40 countries and 13 other education systems (including Florida) that participated in PIRLS.

A detailed treatment of PIRLS 2011 from an international perspective can be found in two reports published by the IEA and available online at <http://timssandpirls.bc.edu/pirls2011/index.html>.

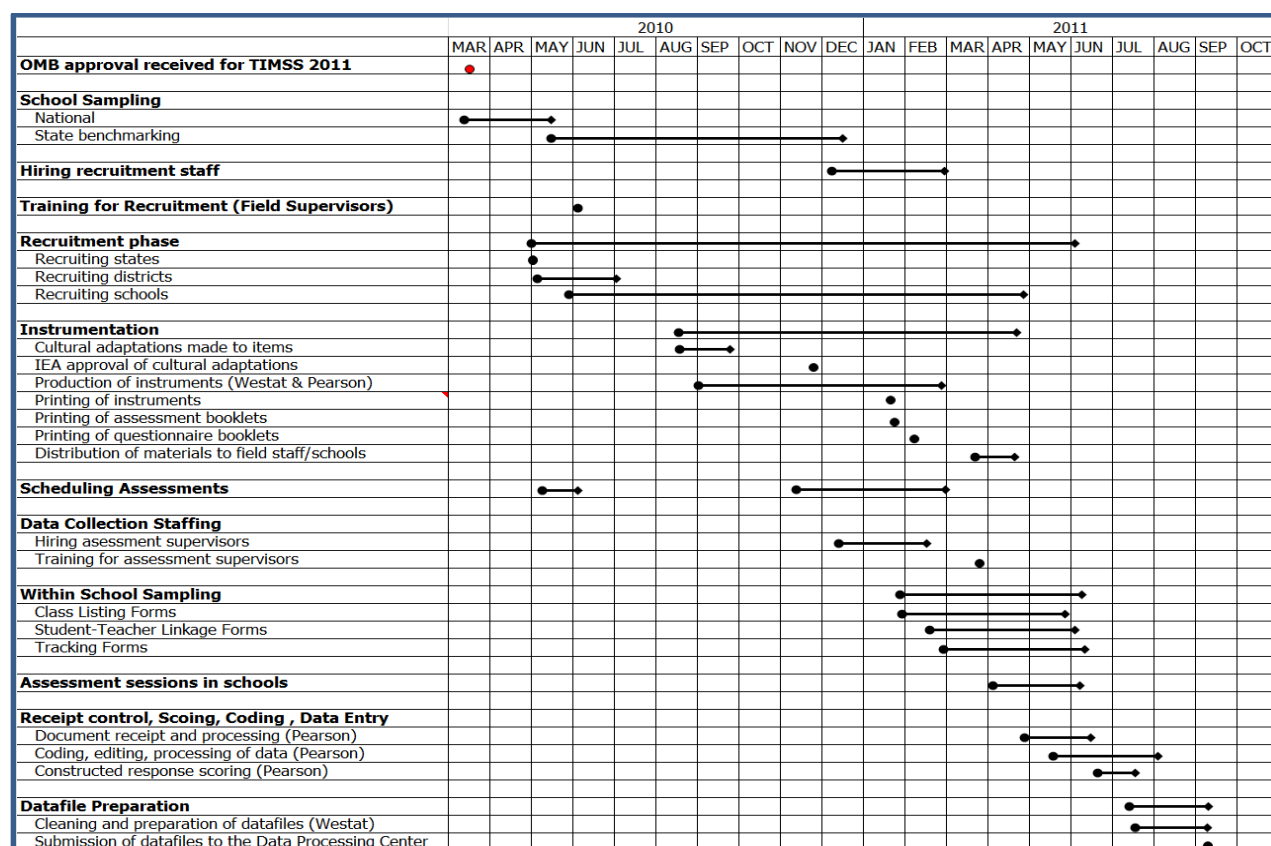
- *PIRLS 2011 International Results in Reading* (Mullis, Martin, Foy, & Drucker, 2012); and
- *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011).

Also available is a U.S. national report, *Highlights From PIRLS 2011: Reading Achievement of U.S. Fourth-Grade Students in an International Context* (Thompson et al., 2012). This report describes the performance of U.S. students relative to their peers in other countries, changes in reading achievement since 2001, and additional details about the achievement of U.S. students nationally and in Florida that are not available in the international reports. The report is available online at <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2013010>.

1.3 TIMSS and PIRLS 2011 U.S. and State Benchmarking Data Collection Activities and Schedule

Descriptions of data collection activities and their timing within the United States provide a foundation for researchers seeking to understand the detail of the data. These activities are listed in exhibit 1-1 along with the timing of their implementation. The activities are described in detail in chapter 4 of this report.

Exhibit 1-1. Schedule for U.S. TIMSS and PIRLS 2011 data collection activities



SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

1.4 Overview of the Design and Administration of TIMSS 2011

The basic parameters of the design and administration of TIMSS and PIRLS 2011 in the United States are outlined below. A more detailed treatment is provided in subsequent chapters of this report. *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011) contains detail on the international design.

Sampling

Participating countries administered TIMSS and PIRLS to national probability samples of students and schools, and other education systems administered TIMSS and PIRLS to comparably representative samples. At grade 4 countries had the option of participating in both TIMSS and PIRLS and were given options for sampling by the TIMSS and PIRLS International Study Center at Boston College. Several countries choose to administer TIMSS and PIRLS in the same schools and assess the same students in both studies. The United States selected a grade 4 sample of schools and administered TIMSS and PIRLS within the same schools but to different students by selecting classrooms within schools to be assessed in either TIMSS or PIRLS.² All education systems were required to draw samples of students who were nearing the end of their fourth year (TIMSS and PIRLS) or eighth year (TIMSS) of formal schooling. Formal schooling was defined as beginning with Level 1 as defined in the International Standard Classification of Education—ISCED (UNESCO, 1999). In most education systems, including the United States, these students were in the fourth and eighth grades. The U.S. national sample included both public and private schools, randomly selected and weighted to be representative of the nation. However, the U.S. state samples were representative state samples only of public school students. In total, 369 U.S. schools and 12,569 fourth-grade students, along with 501 schools and 10,477 eighth-grade students, participated in TIMSS 2011 in the national sample. In PIRLS, 370 schools and 12,726 students participated in the national sample. (Counts for schools and students participating in each of the nine benchmarking states can be found in Appendix A.) The following chapters present detailed information on sampling (chapter 2), participation and response rates (chapter 3), administration (chapter 4), and other technical issues.

²While the majority of the school sample was the same between TIMSS and PIRLS, the composition of schools differed slightly due to small schools with only one class that were assigned to one or the other study during class sampling.

Assessment Design

Data for TIMSS and PIRLS 2011 were collected through paper-and-pencil assessments administered to the students and through questionnaires completed by principals, teachers, and students. To keep the testing burden to a minimum and to ensure broad subject-matter coverage, TIMSS used a matrix sampling approach where the pool of mathematics and science items at each grade level are organized into a set of 14 student achievement booklets, with each student completing only one booklet. Each mathematics and science item appears in two of the booklets in order to link together the student responses from different booklets. The booklets are distributed randomly among students in participating classrooms; in this way, groups of students completing each booklet are approximately equivalent in terms of student ability. PIRLS also employed this method of rotating reading passages and their associated items. The assignment design for TIMSS and PIRLS allowed collecting data across a broad subject content without overburdening the students. This is consistent with other large-scale assessments, such as the National Assessment of Educational Progress (NAEP).

Test Administration

Test administration for TIMSS and PIRLS in the United States occurred April through June 2011. The administration was carried out by professional staff trained according to the international guidelines. School personnel were asked only to assist with listings of students, the identification of space for testing in the school, and the specification of any parental consent procedures required. The International Study Center monitored compliance with the standardized procedures.

Scoring

Both the TIMSS and PIRLS assessment items included both multiple choice and constructed-response items. A scoring rubric (guide) was provided for every constructed response item. The National Research Coordinator in each country was responsible for the scoring and coding of data in that country, following established guidelines.

Scaling

Total scores for mathematics and science in TIMSS, and reading in PIRLS, along with scores that reflect performance in specific domains of each subject, were estimated using an item response theory (IRT) model. For example, the TIMSS 2011 eighth-grade assessment had four scales describing four mathematics content areas and four science content areas, as well as three cognitive domains in each of mathematics and science. Benchmark scores were also derived. IRT estimation procedures were also used to place scores from the four TIMSS assessments conducted in 1995, 1999, 2003, 2007, and 2011 on the same scale (the scale of the 1995 administration). This allows for the calculation of trends in achievement even though the makeup of the countries participating in TIMSS changed over time. Details are provided in Martin and Mullis (2011). The same procedure was employed for PIRLS in which scores from the PIRLS assessments in 2006 and 2011 were placed onto the 2001 scale.

Plausible Values

The matrix sampling approach used in the TIMSS and PIRLS assessments meant that no student responded to all of the items. To accommodate the missing data generated by this design, during the scaling process, plausible values were estimated to characterize students participating in the assessment. Plausible values are imputed values and not test scores for individuals in the usual sense. They represent what the true performance of an individual might have been, had it been observed. They are estimated as random draws (usually five) from an empirically derived distribution of score values based on both the student's observed responses to assessment items and on the student's background variables. A more technical explanation can be found in Martin and Mullis (2011). From the point of view of analysis this means that each analysis has to be repeated five times, once for each plausible value, and the results averaged.

Weighting

Responses from the groups of students were assigned sampling weights to adjust for the complex sample design that resulted in students having an unequal, but known, probability of selection. Additionally, an adjustment for school and student nonresponse was built into the weighting. The estimation of sampling weights was carried out by Statistics Canada. A detailed description is provided in Martin and Mullis (2011). In analyses of the TIMSS and PIRLS data it is necessary to use sampling weights to obtain accurate population estimates.

1.5 Reporting TIMSS and PIRLS Results

Achievement results from TIMSS and PIRLS are reported on a scale from 0 to 1,000, with a scale average of 500 and standard deviation of 100. Even though the education systems participating in TIMSS and PIRLS have changed across the assessment rounds from the first administration (TIMSS in 1995 and PIRLS in 2001), comparisons between the 2011 results and prior results are still possible because the achievement scores in each of the assessments are placed on a scale that is not dependent on the list of participating education systems in any particular year. A more detailed explanation of the assessment's equating and scaling can be found in Martin and Mullis (2011).

In addition to numerical scale results, TIMSS and PIRLS also include international benchmarks. The international benchmarks provide a way to interpret the scale scores and to understand how students' proficiency in a subject varies along the assessment scale. The benchmarks for both TIMSS and PIRLS describe four levels of student achievement in each subject, based on the kinds of skills and knowledge students at each score cut point would need to successfully answer the items. More information on the development of the benchmarks and the procedures used to set the score cut points can be found in Martin and Mullis (2011).

1.6 U.S. International and National Data Files

Three versions of the U.S. national data are available as follows:

- The **TIMSS and PIRLS U.S. international data files** that are available as part of the international database released by the International Study Center. The U.S.-specific TIMSS data files can be downloaded from <http://timssandpirls.bc.edu/timss2011/international-database.html>. The U.S.-specific PIRLS data files are available separately and can be downloaded from <http://timssandpirls.bc.edu/pirls2011/international-database.html>. These data files conform to the international specifications common to the data files from all countries. However, they do not include the U.S.-specific adaptations made to a few questions in the questionnaires or the additional questions added to the school and student questionnaires, such as the question on race/ethnicity added to the student questionnaire. Data for U.S. states are not included in the international data files due to potential confidentiality issues.

- The **TIMSS and PIRLS U.S. national public-use data files** that are available through the National Center for Education Statistics. The TIMSS U.S. national dataset can be downloaded from <http://nces.ed.gov/timss/datafiles.asp>. The PIRLS U.S. national dataset can be downloaded from <http://nces.ed.gov/surveys/pirls/datafiles.asp>. These U.S. data files include (a) the U.S.-specific adaptations made to questionnaire items and (b) additional questions added to the school and student questionnaires.
- The **TIMSS and PIRLS U.S. national restricted-use data files** that are available through the National Center for Education Statistics. Access to these files may be obtained by completing a restricted-use license agreement with NCES. The restricted-use data files are provided only on CD. These data files contain supplemental link files that link TIMSS or PIRLS school ID numbers to the school ID numbers as they appear in the publicly available Common Core of Data (CCD) or the Private School Universe Survey (PSS). In addition, race/ethnicity is provided with all available categories and free or reduced-price lunch is provided as a continuous variable. Because these data can reveal the identities of participating schools, the restricted-use data files are only made available to those who obtain a NCES restricted-use data license. Directions on how to obtain the license can be found at <http://nces.ed.gov/pubsearch/licenses.asp>.

State data are available for each of the benchmarking states via state-specific, restricted-use data files. Access to these files may be obtained by completing a restricted-use license agreement with NCES. These restricted-use data files are provided only on CD. They contain all of the data in the public released national data files plus the supplemental link files that link TIMSS or PIRLS school ID numbers to the school ID numbers as they appear in the publicly available Common Core of Data (CCD) or the Private School Universe Survey (PSS). Because these data can reveal the identities of participating schools, the restricted-use data files are only made available to those who obtain a NCES restricted-use data license. Directions on how to obtain the license can be found at <http://nces.ed.gov/pubsearch/licenses.asp>.

The most comprehensive treatment of the TIMSS and PIRLS international data, and hence of the U.S. international data file, is provided in the various TIMSS 2011 and PIRLS 2011 publications produced by the International Association for the Evaluation of Educational Achievement (IEA), particularly the *TIMSS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013) and the *PIRLS 2011 User Guide for the International Database* (Foy & Drucker, 2013). This publication should be seen as the primary reference. The *TIMSS and PIRLS 2011 U.S. Technical Report and User Guide* draws heavily on the international user's guide for much of its data file-related content. This content is supplemented with detail on those aspects of the TIMSS 2011 and PIRLS 2011 data that were unique to the United States.

2. Sampling Schools

The 2011 TIMSS and PIRLS sample design consisted of the following samples:

- U.S. TIMSS fourth-grade national sample;
- U.S. PIRLS fourth-grade national sample;
- U.S. TIMSS eighth-grade national sample;
- NAEP-TIMSS eighth-grade national linking study sample;
- TIMSS fourth-grade state samples;
- PIRLS fourth-grade state sample; and
- TIMSS eighth-grade state benchmarking samples.

Each of the first three pairs of samples are described jointly in this chapter because they shared the same sampled schools though they assessed separate classrooms within each school.

All of the 2011 TIMSS and PIRLS school samples were drawn for the United States in March 2010. The sample design for the U.S. national school samples were developed to retain most of the properties of the 2007 TIMSS and 2006 PIRLS U.S. school samples, and to follow international requirements as given in Martin and Mullis (2011). The U.S. samples again followed a two-stage sampling process with the first stage a sample of schools, and the second stage a sample of classrooms within schools. All students in sampled classrooms were selected for assessment.

U.S. TIMSS and PIRLS Fourth-Grade National Samples

The 2011 TIMSS and PIRLS national sample design for the fourth grade was similar to the sample design of TIMSS 2007 and PIRLS 2006 in that (a) the student population was defined as the set of all fourth-graders in the United States in both public and private schools, and (b) one or two classrooms were selected for each assessment in each sampled school. However, the 2011 TIMSS and PIRLS national sample design for the fourth grade differed from previous administrations of TIMSS and PIRLS in that there was one joint sample with up to four classrooms selected from each school. Schools in the sample with four or more fourth-grade classes had two classes randomly designated to either TIMSS or PIRLS, and the other two classes designated to the other study. In schools with three fourth-grade classes, two classes were randomly designated to one study, and the remaining class to the other study. In schools with

two fourth-grade classes, one class was randomly designated to one study, and the second class to the other study. In small schools with only one fourth-grade class, that class was randomly designated to either the TIMSS or PIRLS study. Thus, under this joint sampling design, the national fourth-grade sample contained

- schools with one classroom designated to TIMSS;
- schools with one classroom designated to PIRLS; and
- schools with two or more classrooms contributing classes to both TIMSS and PIRLS.

In total, the 2011 fourth-grade national joint TIMSS-PIRLS school sample consisted of 450 schools containing at least one fourth-grade class. The schools were selected with probability proportionate to the school's estimated grade enrollment of fourth-graders from the 2011 National Assessment of Educational Progress (NAEP) school frame using 2007-08 school data. The overall sample design was intended to approximate a self-weighting sample of students as much as possible in accordance with the international guidelines, with each fourth-grade student in the United States having an equal probability of being selected.

U.S. TIMSS Eighth-Grade National and NAEP-TIMSS Eighth-Grade National Linking Study Samples

The sample design for the eighth-grade national TIMSS assessment was also similar to the sample design of TIMSS 2007 in that the student population is the set of all eighth-graders in the United States in both public and private schools. However, unlike previous cycles where two classes per school were selected, only one class per school was selected in 2011. This was due to a special NAEP-TIMSS linking study that was administered jointly in the same schools and that assessed a second classroom³ in a separate session from the TIMSS assessment. Thus, the TIMSS 2011 national school sample consisted of 600 schools with at least one eighth-grade class. The schools were selected with probability proportionate to the school's estimated grade enrollment of eighth-graders from the 2011 NAEP school frame using 2007-08 school data. The overall sample design was intended to approximate a self-weighting sample of students as much as possible in accordance with the international guidelines, with each eighth-grade student in the United States having an equal probability of being selected.

³Small schools with only one fourth-grade class would be designated to either the TIMSS or NAEP_TIMSS Linking study.

TIMSS and PIRLS State Samples

In 2011, a PIRLS public school state sample was drawn for Florida; and a TIMSS public school state sample was drawn for Florida and North Carolina at both fourth- and eighth-grade and for Alabama, California, Colorado, Connecticut, Indiana, Massachusetts, and Minnesota at eighth grade only. The 2011 TIMSS and PIRLS state samples replicated the national sample design, with the following differences: (a) there was only one joint sample at the fourth grade (in Florida), and (b) there was no NAEP-TIMSS linking study at the eighth grade in any of the benchmarking states. The school frame to draw the state samples was identical to the national frame of public schools in those states. The state samples included the schools in each state that were previously selected as part of the TIMSS and PIRLS national samples (these are sometimes referred to as “overlap” schools) plus a supplement of schools to reach the internationally set target of 100 assessed classrooms in each state.

All Samples

Schools were explicitly stratified by poverty level, public/private status, and census region. The schools were implicitly stratified by sorting by locale (city, suburb, town and rural), race/ethnicity enrollment (above or below 15 percent Black, Hispanic, Asian and Pacific Islander,⁴ and American Indian and Alaska Native), and the estimated grade enrollment within each explicit stratum. A systematic sample was selected independently in each stratum with sampling probabilities proportional to measures of size, (PPS) where the measure of size is the estimated number of students in fourth or eighth grade.

There was no oversampling for either grade or study in 2011. Overlap with the 2011 NAEP school sample was minimized even though the TIMSS-PIRLS sample had to be selected before the NAEP sample because of TIMSS-PIRLS scheduling constraints.⁵ The overlap between the samples was minimized when the 2011 NAEP sample was selected.

The rest of this chapter describes the school samples. Section 2.1 describes the sampling frame—the data sources, data preparation, and the stratification variables. Section 2.2 describes the national school sample

⁴Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

⁵In order to maximize response rates from both districts and schools, it was necessary to begin the recruitment of both prior to the end of the 2009-10 school year.

selection—the measure of size, substitute schools, and selecting classrooms. Section 2.3 describes the state school sample selection. The data collection methods are covered in a chapter 4.

2.1 School Sampling Frames

The U.S. school sampling frames for fourth and eighth grade were developed from two national databases in the National Center for Education Statistics—public schools in the Common Core of Data (CCD <http://nces.ed.gov/ccd/>) and private schools in the Private School Survey (PSS <http://nces.ed.gov/surveys/pss/>). These sources provide full coverage of all fourth- and eighth-grade students in the education system in the United States. The TIMSS-PIRLS 2011 fourth-grade school frame and the TIMSS 2011 eighth-grade school frame were constructed using the 2007-08 CCD and the 2007-08 PSS, the most current data at the time of the frame construction.

The data preparation of the school frames benefited from procedures developed for the National Assessment of Educational Progress (NAEP), a large educational survey in the United States. The NAEP method was described in the 1998 NAEP technical report (Allen, Donoghue, & Schoeps, 2001), and the most up-to-date information for each NAEP survey is available at <http://nces.ed.gov/nationsreportcard/>. Additional NAEP reports are scheduled for release in the coming months. The school frames used the NAEP 2011 school frame as an input data source.

Eligible schools in the school frames included schools operating in the 50 states and the District of Columbia, Department of Defense (DoD) domestic schools, and Bureau of Indian Education (BIE) schools. Schools in Puerto Rico and U.S. territories, DoD schools overseas, adult education institutions with no fourth- or eighth-grade students, and non-education institutions (e.g., home schools, correspondence schools) were ineligible for the study.

Fourth-Grade Frame

Any school having a fourth grade as of the school year 2007-08 was included on the TIMSS-PIRLS fourth-grade school sampling frame. Table 2-1 presents frame tabulations of the number of schools by the school grade span (lowest to highest grade level of the school).

Table 2-1. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by grade span: 2011

Grade span	Students	Percent	Schools	Percent
Total	4,056,740	100	72,309	100
Grades 1-5	2,007,383	49.5	26,317	36.4
Grades 1-6	703,095	17.3	13,052	18.1
Grades 1-8	464,896	11.5	15,297	21.2
Grades 1-12	135,407	3.4	6,135	8.5
Other	745,959	18.4	11,508	15.9

NOTE: The “other” grade spans includes all additional grade spans. Detail may not sum to totals because of rounding.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS); 2011. Progress in International Reading Literacy Study (PIRLS), 2011.

Eighth-Grade Frame

Any school having an eighth grade as of the school year 2007-08 was included on the TIMSS eighth-grade school sampling frame. Table 2-2 presents frame tabulations of the number of schools by the school grade span (lowest to highest grade level of the school).

Table 2-2. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by grade span: 2011

Grade span	Students	Percent	Schools	Percent
Total	4,012,076	100	46,312	100
Grades 1 to 8	464,914	11.6	15,297	33.0
Grades 6 to 8	2,122,023	52.9	9,989	21.6
Grades 1 to 12	135,447	3.4	6,135	13.3
Grades 7 to 12	143,229	3.6	3,213	6.9
Grades 7 to 8	686,791	17.1	2,878	6.2
Other	459,672	11.5	8,800	19.0

NOTE: Detail may not sum to totals because of rounding. The “Other” grade spans includes all additional grade spans.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Stratification

The sample design was a stratified systematic sample within each stratum, with sampling probabilities proportional to size (PPS). Stratification was used for sample efficiency and consistency with previous designs. The explicit strata were formed by the following variables, shown in alphabetical order:

- Census region—Northeast, Midwest, South, and West;
- poverty level⁶—for public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the free or reduced-price lunch program (FRPL), and “low” poverty is defined as having less than 50 percent eligible; and
- school type—school is either under public control (operated by publicly elected or appointed officials) or private control (operated by privately elected or appointed officials and derives its major source of funds from private sources).

Within each stratum, the frame was implicitly stratified by the following three categorical stratification variables:

- locale—urban-centric locale code, i.e., city, suburb, town, rural;
- race/ethnicity status—student population in the school is “15 percent or above” or “below 15 percent” Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students;⁷ and
- estimated grade enrollment.

Fourth-Grade Stratification

The following tables show the total number and percentage of fourth-grade students and schools in the TIMSS-PIRLS 2011 school frame by census region (table 2-3), poverty level (table 2-4), school type (table 2-5), locale (table 2-6), race/ethnicity status (table 2-7), and by poverty level, school type and region (table 2-8).

⁶The sample frame did not contain a direct measure of poverty. No National School Lunch Program (NSLP) data were available for private schools, thus all private schools are treated as low-poverty schools.

⁷Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

Table 2-3. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by region: 2011

Region	Students	Percent	Schools	Percent
Total	4,056,740	100	72,309	100
Northeast	670,506	16.5	12,824	17.7
Midwest	885,979	21.8	18,605	25.7
South	1,537,165	37.9	23,713	32.8
West	963,090	23.7	17,167	23.8

NOTE: Detail may not sum to totals because of rounding. Region of country is based on Census definitions.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-4. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by poverty level: 2011

Poverty level	Students	Percent	Schools	Percent
Total	4,056,740	100	72,309	100
High	1,610,082	39.7	23,166	32.0
Low	2,446,658	60.3	49,143	68.0

NOTE: For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-5. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by school type: 2011

School type	Students	Percent	Schools	Percent
Total	4,056,740	100	72,309	100
Private	387,559	9.6	20,852	28.8
Public	3,669,181	90.4	51,457	71.2

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-6. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by locale: 2011

Locale	Students	Percent	Schools	Percent
Total	4,056,740	100	72,309	100
City	1,235,518	30.5	21,879	30.3
Suburb	1,457,038	35.9	22,254	30.8
Town	479,595	11.8	8,184	11.3
Rural	884,589	21.8	19,992	27.6

NOTE: For definitions of these urban-centric locales, see

<http://nces.ed.gov/surveys/urbaned/definitions.asp>.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-7. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by race/ethnicity status: 2011

Race/ethnicity status	Students	Percent	Schools	Percent
Total	4,056,740	100	72,309	100
15 percent or above	2,535,765	62.5	39,341	54.4
Below 15 percent	1,520,975	37.5	32,968	45.6

NOTE: Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-8. Number and percentage of students and schools included in the U.S. TIMSS-PIRLS fourth-grade school sampling frame, by region, poverty level, and school type: 2011

Region	Poverty level	School type	Students	Percent	Schools	Percent
Total			4,056,740	100	72,309	100
Northeast	High	Public	183,987	4.5	2,647	3.7
Midwest	High	Public	224,192	5.5	4,153	5.7
South	High	Public	761,830	18.8	10,205	14.1
West	High	Public	440,073	10.8	6,161	8.5
Northeast	Low	Private	87,838	2.2	4,701	6.5
Midwest	Low	Private	97,418	2.4	5,426	7.5
South	Low	Private	126,634	3.1	6,491	9.0
West	Low	Private	75,669	1.9	4,234	5.9
Northeast	Low	Public	398,681	9.8	5,476	7.6
Midwest	Low	Public	564,369	13.9	9,026	12.5
South	Low	Public	648,701	16.0	7,017	9.7
West	Low	Public	447,348	11.0	6,772	9.4

NOTE: Region of country is based on Census definitions. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Eighth-Grade Stratification

The following tables show the total number and percentage of eighth grade students and schools in the TIMSS 2011 eighth-grade school frame by Census region (table 2-9), poverty level (table 2-10), school type (table 2-11), locale (table 2-12), race/ethnicity status (table 2-13), and by poverty level, school type, and region (table 2-14).

Table 2-9. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by region: 2011

Region	Students	Percent	Schools	Percent
Total	4,012,076	100	46,312	100
Northeast	687,958	17.1	8,745	18.9
Midwest	892,364	22.2	12,546	27.1
South	1,479,254	36.9	14,735	31.8
West	952,500	23.8	10,286	22.2

NOTE: Region of country is based on Census definitions.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-10. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by poverty level: 2011

Poverty level	Students	Percent	Schools	Percent
Total	4,012,076	100	46,312	100
High	1,353,825	33.7	11,345	24.5
Low	2,658,251	66.3	34,967	75.5

NOTE: For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-11. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by school type: 2011

School type	Students	Percent	Schools	Percent
Total	4,012,076	100	46,312	100
Private	373,091	9.3	18,710	40.4
Public	3,638,985	90.7	27,602	59.6

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-12. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by locale: 2011

Locale	Students	Percent	Schools	Percent
Total	4,012,076	100	46,312	100
City	1,190,107	29.7	13,134	28.4
Suburb	1,434,200	35.7	12,524	27.0
Town	496,556	12.4	5,560	12.0
Rural	891,213	22.2	15,094	32.6

NOTE: For definitions of these urban-centric locales, see

<http://nces.ed.gov/surveys/urbaned/definitions.asp>.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-13. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by race/ethnicity status: 2011

Race/ethnicity status	Students	Percent	Schools	Percent
Total	4,012,076	100	46,312	100
15 percent or above	2,518,075	62.8	23,372	50.5
Below 15 percent	1,494,001	37.2	22,940	49.5

NOTE: Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-14. Number and percentage of students and schools included in the U.S. TIMSS eighth-grade school sampling frame, by region, poverty level, and school type: 2011

Region	Poverty level	School type	Students	Percent	Schools	Percent
Total			4,012,076	100	46,312	100
Northeast	High	Public	158,560	4.0	1,398	3.0
Midwest	High	Public	180,246	4.5	2,175	4.7
South	High	Public	628,262	15.7	4,990	10.8
West	High	Public	386,757	9.6	2,782	6.0
Northeast	Low	Private	88,216	2.2	4,523	9.8
Midwest	Low	Private	91,422	2.3	4,708	10.2
South	Low	Private	121,053	3.0	5,713	12.3
West	Low	Private	72,400	1.8	3,766	8.1
Northeast	Low	Public	441,182	11.0	2,824	6.1
Midwest	Low	Public	620,696	15.5	5,663	12.2
South	Low	Public	729,939	18.2	4,032	8.7
West	Low	Public	493,343	12.3	3,738	8.1

NOTE: Detail may not sum to totals because of rounding. Region of country is based on Census definitions. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

2.2 National School Samples

The U.S. national samples used a two-stage design—a stratified systematic sample of schools with sampling probabilities proportional to size (PPS) and then classes within sampled schools. The school selection probability was configured such that all fourth- or eighth-grade students in the United States would have approximately equal probability of being selected in the samples. A sample of 450 schools was drawn from the fourth-grade frame; and a sample of 600 schools was drawn from the eighth-grade frame.

Within each explicit stratum, the frames were implicitly stratified by two categorical stratification variables. The order of the stratification is not given because of confidentiality concerns. Each frame was sorted in alternating (serpentine) sort order according to these school characteristics, implicitly stratifying the frame. The last sort within the implicit stratification was by grade enrollment (measure of size or *MOS*) in descending order. Alternating the “sort order” sorts a frame from lowest to highest value with

respect to the first sort variable, then within each level of the first sort variable, the second sort variable alternates its sort order, from lowest to highest for the first level of the first sort variable, then from highest to lowest for the second level of the first sort variable, then again from lowest to highest for the third level of the first sort variable, and so on. Each of the variables will alternate the sort order within each level of the preceding sort variable. This means that schools adjacent on the list are not substantially different or at most different by one sorting characteristic.

Measure of Size

The goal for the TIMSS-PIRLS sample was to attain a self-weighting student sample. To achieve this, schools' probability of selection was related to their measure of size (MOS), which is proportional to its share of the target population, that is, the fourth- or eighth-grade enrollments. This method also reduces the chance of selection for smaller schools. This improves cost efficiency by increasing the number of students per school. However, students in schools with enrollments of only a few students would have very large weights if selected. To minimize the impact of these small schools on variances and estimates, the minimum measure of size was set to 5.

The following is a summary of the steps for assigning measures of size to the schools on the TIMSS and PIRLS frames.

Determine the estimated target population size for the school. This is the estimated enrollment per grade (4 or 8) from the school frame. If the grade 4 or 8 enrollment is not available, it is calculated by dividing the school's total enrollment by the number of grades in the school.

Calculate measures of size according to the estimated enrollment per grade as shown:

$$MOS = \begin{cases} 5 & \text{if grade 4 or 8 enrollment} \leq 5 \\ \text{grade 4 or 8 enrollment} & \text{otherwise} \end{cases}$$

Substitute Schools

Although efforts were made to secure the participation of all schools selected, it was anticipated at the time of sampling that not all schools would choose to participate. Therefore, as each school was selected for a sample, the two neighboring schools in the sampling frame were designated as substitute schools.

The first school following the sample school was the first substitute, and the first school preceding it was the second substitute. If an original school refused to participate, the first substitute was then contacted. If that school also refused to participate, the second substitute was then contacted.

There were several constraints on the assignment of substitutes. One sampled school was not allowed to be a substitute for another, and a given school could not be assigned to be a substitute for more than one sampled school. Furthermore, substitutes were required to be in the explicit stratum as the sampled school. If the sampled school was the first or last school in the stratum, then the second school following or preceding the sampled school was identified as the substitute. If the first substitute school did not have the same implicit stratification values as the sampled school, the first and second substitute were switched. Under these rules, it was possible to identify two substitutes for each sampled school.

Selecting Classrooms

The final stage of selection was of classrooms within schools. Within each sampled school that agreed to participate in TIMSS and PIRLS at fourth grade, all classrooms in the school were listed on the classroom sampling frame. Within each sampled school that agreed to participate in TIMSS at eighth grade, all mathematics classrooms in the school were listed on the classroom sampling frame. Schools were asked to indicate the names of all classes containing fourth- or eighth-grade students, the number of fourth- or eighth-grade students in the class, and whether it was a “special class” in which all or most of the students were learning disabled or classified as having limited English proficiency. Because TIMSS and PIRLS do not provide accommodations, classrooms were excluded from the subsequent classroom sampling if all or most of the students were learning disabled. Classrooms with fewer than 15 students were collapsed into *pseudoclassrooms* so that each classroom on the school’s classroom sampling frame had at least 20 students.⁸ An equal probability sample of classrooms or pseudoclassrooms was sampled from the classroom frame for each school. All students in sampled classrooms (pseudoclassrooms) were selected for assessment.

Schools in the sample with four or more fourth-grade classes had two classes randomly designated to either TIMSS or PIRLS and the other two designated to the other study. In schools with three fourth-grade classes, two classes were randomly designated to one study, and the remaining class to the other

⁸Pseudoclasses were automatically created during the sampling of classes if there were small classes in a school. A small class was defined as a class for which the number of students was smaller than half the average class size in the explicit stratum across all schools. In such a case, WinW3S will automatically sampled two or more classes that were grouped together to form a pseudoclass.

study. In schools with two fourth-grade classes, one class was randomly designated to one study and the second class to the other study. In small schools with only one fourth-grade class, that class was randomly designated to either the TIMSS or PIRLS study. Thus, under this sampling design, the three groups of schools samples are as follows:

- schools with one classroom designated to TIMSS,
- schools with one classroom designated to PIRLS, and
- schools with two or more classrooms contributing classes to both TIMSS and PIRLS.

Schools of two or more eighth-grade classes were identified in the sample, and classes in those schools were randomly designated to either TIMSS or the NAEP-TIMSS linking study. Schools with only one eighth-grade class were randomly assigned to either TIMSS or the NAEP-TIMSS linking study.

Tabulations Within Subgroups for Frame and Sample

This section provides an overview of the frame and sample for the explicit and implicit strata used in the sample process. The PPS sampling and stratification worked effectively: the sample percentage of schools is close to the measure-of-size percentage of the frame for all the implicit strata. For these strata-defining subgroups, tables 2-15 through 2-26 present the following summary tabulations in these subgroups:

- **Total measure of size.** This is the summation of MOS_{ij} over the subgroup. Note that this is larger than the national population student size because the minimum MOS_{ij} is set to 5 for small schools; and
- **Sample size.** This is the final realized sample size of schools in the subgroup for the U.S. TIMSS-PIRLS fourth- or eighth-grade samples.

Fourth-Grade Tabulations

This section provides an overview of the fourth-grade frame and sample distribution by each of the stratification variables. Each table shows the total number and percentage of fourth-grade students in the sampling frame (data shown in tables 2-15 through 2-20) and the total number and percentage of schools

in the TIMSS-PIRLS school sample.⁹ By each stratification variable, the tables are Census region (table 2-15), poverty level (table 2-16), school type (table 2-17), locale (table 2-18), race/ethnicity status (table 2-19), and by poverty level, school type, and region (table 2-20).

Table 2-15. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS-PIRLS fourth-grade, by region: 2011

Region	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,067,306	100	450	100
Northeast	672,435	16.5	74	16.4
Midwest	888,557	21.8	98	21.8
South	1,540,111	37.9	170	37.8
West	966,203	23.8	108	24.0

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. Region of country is based on Census definitions.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-16. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS-PIRLS fourth-grade, by poverty level: 2011

Poverty level	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,067,306	100	450	100
High	1,611,039	39.6	178	39.6
Low	2,456,267	60.4	272	60.4

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

⁹The measure of size (MOS) defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These are consistently larger than the estimated student sample size (reported in tables 2.1-2.14), which is the estimate of the number of students in the sampled schools and have no minimum per school.

Table 2-17. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS-PIRLS fourth-grade, by school type: 2011

School type	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,067,306	100	450	100
Private	395,483	9.7	44	9.8
Public	3,671,823	90.3	406	90.2

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-18. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS-PIRLS fourth-grade, by locale: 2011

Locale	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,067,306	100	450	100
City	1,237,410	30.4	138	30.7
Suburb	1,459,072	35.9	161	35.8
Town	480,958	11.8	51	11.3
Rural	889,866	21.9	100	22.2

NOTE: For definitions of these urban-centric locales, see

<http://nces.ed.gov/surveys/urbaned/definitions.asp>. Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-19. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS-PIRLS fourth-grade, by race/ethnicity status: 2011

Race/ethnicity status	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,067,306	100	450	100
15 percent or above	2,540,199	62.5	278	61.8
Below 15 percent	1,527,107	37.5	172	38.2

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Table 2-20. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS-PIRLS fourth-grade, by region, poverty level, and school type: 2011

Region	Poverty level	School type	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			4,067,306	100	450	100
Northeast	High	Public	184,025	4.5	20	4.4
Midwest	High	Public	224,455	5.5	25	5.6
South	High	Public	761,980	18.7	84	18.7
West	High	Public	440,579	10.8	49	10.9
Northeast	Low	Private	89,664	2.2	10	2.2
Midwest	Low	Private	99,233	2.4	11	2.4
South	Low	Private	129,185	3.2	14	3.1
West	Low	Private	77,401	1.9	9	2.0
Northeast	Low	Public	398,746	9.8	44	9.8
Midwest	Low	Public	564,869	13.9	62	13.8
South	Low	Public	648,946	16.0	72	16.0
West	Low	Public	448,223	11.0	50	11.1

NOTE: Detail may not sum to totals because of rounding. Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. Region of country is based on Census definitions. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Eighth-Grade Tabulations

This section provides an overview of the eighth-grade frame and sample distribution by each of the stratification variables. Each table shows the total number and percentage of eighth-grade students in the sampling frame (data shown in tables 2-21 through 2-26 and the total number and percentage of schools in the TIMSS eighth-grade school sample. By each stratification variable, the tables are Census region (table 2-21), poverty level (table 2-22), school type (table 2-23), locale (table 2-24), race/ethnicity status (table 2-25), and by poverty level, school type, and region (table 2-26).

Table 2-21. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS eighth-grade, by region: 2011

Region	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,024,167	100	600	100
Northeast	690,035	17.1	103	17.2
Midwest	895,169	22.2	133	22.2
South	1,482,889	36.9	221	36.8
West	956,074	23.8	143	23.8

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. Region of country is based on Census definitions.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-22. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS eighth-grade, by poverty level: 2011

Poverty level	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,024,167	100	600	100
High	1,355,600	33.7	203	33.8
Low	2,668,567	66.3	397	66.2

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-23. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS eighth-grade, by school type: 2011

School type	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,024,167	100	600	100
Private	380,980	9.5	56	9.3
Public	3,643,187	90.5	544	90.7

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-24. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS eighth-grade, by locale: 2011

Locale	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,024,167	100	600	100
City	1,192,531	29.6	179	29.8
Suburb	1,436,705	35.7	213	35.5
Town	498,424	12.4	75	12.5
Rural	896,507	22.3	133	22.2

NOTE: For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-25. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS eighth-grade, by race/ethnicity status: 2011

Race/ethnicity status	Frame		Sample	
	Measure of size	Percent	Number of schools	Percent
Total	4,024,167	100	600	100
15 percent or above	2,524,187	62.7	378	63.0
Below 15 percent	1,499,980	37.3	222	37.0

NOTE: Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 2-26. Number and percentage of students in the sampling frame and number and percentage of schools in the sample, U.S. TIMSS eighth-grade, by region, poverty level, and school type: 2011

Region	Poverty level	School type	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			4,024,167	100	600	100
Northeast	High	Public	158,633	3.9	24	4.0
Midwest	High	Public	180,697	4.5	27	4.5
South	High	Public	628,781	15.6	94	15.7
West	High	Public	387,489	9.6	58	9.7
Northeast	Low	Private	90,144	2.2	13	2.2
Midwest	Low	Private	93,092	2.3	14	2.3
South	Low	Private	123,526	3.1	18	3.0
West	Low	Private	74,218	1.8	11	1.8
Northeast	Low	Public	441,258	11	66	11.0
Midwest	Low	Public	621,380	15.4	92	15.3
South	Low	Public	730,582	18.2	109	18.2
West	Low	Public	494,367	12.3	74	12.3

NOTE: Detail may not sum to totals because of rounding. Measure of size is the estimated number of students enrolled in the target grade with a minimum of 5 students per school. Region of country is based on Census definitions. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.”

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

2.3 State School Samples

The state school samples were selected only for public schools as follows:

- TIMSS fourth-grade sample – North Carolina;
- TIMSS and PIRLS fourth-grade samples – Florida; and
- TIMSS eighth-grade benchmarking samples – Alabama, California, Colorado, Connecticut, Florida, Indiana, Massachusetts, Minnesota, and North Carolina.

The school frame used to draw the state samples was identical to the national frame of public schools in those states and grades.¹⁰ However, the North Carolina fourth-grade state school selection differed from that for Florida because North Carolina did not participate in PIRLS. Thus, its fourth-grade sample was completely independent and did not include the schools in the state that were selected for the national sample (overlap schools). In contrast, Florida's fourth-grade state sample and the eighth-grade benchmarking state samples were based on an integrated state and national design in which schools in the state that were selected for the national sample were also selected for the state sample. For each state, tables showing its frame and sample distribution, by each of the stratification variables, are provided in appendix A.

The rest of the design was similar to the national design where possible. There were only two explicit strata per state (high/low poverty level), as the other national strata did not apply to state samples. As with the national samples, the frame was implicitly stratified by location, race/ethnicity enrollment, and estimated grade enrollment. In addition, it was also implicitly stratified by state achievement scores.¹¹ The MOS for each school was the same as in the national design. Substitute schools were assigned using the same procedure.

The procedure for selecting classrooms was also the same as in the national design. However, both classes were assigned to the state sample in schools with two or more classes for the fourth-grade North Carolina and eighth-grade benchmarking samples, while the classroom designation was the same as the national design for the fourth-grade Florida sample.

School Selection for the Integrated Design

The state samples for Alabama, California, Colorado, Connecticut, Florida, Indiana, Massachusetts, and Minnesota, and North Carolina at eighth-grade used an integrated design. As mentioned above, the fourth-grade sample in North Carolina differed in that it was independent. The integrated design included the schools in each state that were previously selected as part of the TIMSS and PIRLS national samples plus a supplement of schools to reach the international target of 100 assessed classrooms. The target was in terms of the number of classrooms rather than schools because with the integration of the national design there were a varying number of national sample schools per state. For the eighth-grade samples,

¹⁰For this reason, tables are not provided showing the frame distributions for each benchmarking state by each of the respective stratification variables. Tables showing the each state's frame and sample distribution by each of the stratification variables are provided in appendix A.

¹¹The state achievement scores were derived for NAEP from the results of the state assessment programs obtained from each state.

one class was selected for TIMSS and one for the NAEP-TIMSS linking study in each school. Thus, only one classroom from each of the national schools was included in the state assessment. The supplemental grade 8 sample of schools selected for each state followed the normal TIMSS procedure of selecting two classes per school. The additional number of schools needed in each state is then $([100 - \# \text{ national public schools}] / 2)$ plus an additional five schools per state to account for ineligible schools. The supplemental fourth-grade Florida sample followed the TIMSS-PIRLS procedure of selecting four classes per school, so an additional 20 supplemental schools were selected to account for schools with fewer than four classrooms.

The integrated sample was selected using a version of the Keyfitz procedure (Keyfitz, 1951); Chowdhury, Chu, & Kaufman, (2001) have described the implementation of the procedure. The method is generally used to minimize overlap between one or more surveys, but it can also be used to maximize overlap by ordering the rows in descending order of the response load indicator. By following the process outlined in table 2 of the Chowdhury, Chu, and Kaufman paper, the rows in the table can be thought of as a hierarchy of selection preference, where the top row maximizes the probability and the bottom row minimizes it. This property allowed us to maximize the overlap with the TIMSS national sample (in fact, select all national schools) while minimizing the overlap with the NAEP state operational public school sample or “Alpha sample.”¹² By maximizing the overlap with the national sample, the assessed classrooms can be included in both studies with proper probabilities. This minimization was undertaken to reduce the burden for schools selected in the NAEP Alpha sample and to improve response rates. This was accomplished by partitioning the frame into the following three groups shown in order, as in table 2 of the paper. The three groups were as follows:

- schools selected for the TIMSS national sample (including schools also selected for the NAEP Alpha sample);
- schools not selected for either the TIMSS national sample or the NAEP Alpha sample; and
- schools selected for the NAEP Alpha sample and not for the TIMSS national sample.

With this design, the method guarantees all schools in group 1 will be selected with certainty since the probability of being selected for the integrated sample is always larger than being selected for the national sample and since more schools were selected in each state sample (the national schools plus a state supplement) than in the national sample with the frames being identical. The method minimized the

¹²For a complete definition of the NAEP Alpha sample, see the NCES NAEP glossary at http://nces.ed.gov/nationsreportcard/glossary.asp#alpha_sample.

overlap with schools in group 3 (NAEP Alpha sample) and selected the majority of the state supplement from schools in group 2. Table 2-27 presents the composition of the state integrated sample by sample type and state. See appendix A for the tables of the frame and sample distribution by each of the stratification variables for each state sample.

Table 2-27. Number of schools included in the state samples, by grade/design, state, and sample type: 2011

Grade/design	State	Number of schools in national sample	Number of schools in state supplement sample	Number of schools in state integrated sample
Fourth (independent)	NC	0	49	49
Fourth-integrated	FL	21	60	81
Eighth-integrated	AL	12	51	63
	CA	73	21	94
	CO	10	50	60
	CT	11	52	63
	FL	21	44	65
	IN	10	52	62
	MA	8	50	58
	MN	8	52	60
	NC	15	47	62

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

School Selection for the North Carolina Fourth-Grade Design

Ideally, the objective for the North Carolina state samples was that they would not include the schools that were previously selected as part of the TIMSS national sample. By again following the Keyfitz procedure outlined in table 2 of Chowdhury, Chu, and Kaufman (2001), the procedure allowed us to minimize the overlap with the TIMSS national and NAEP Alpha (public school) samples. By minimizing the overlap with the national sample, the assessed classrooms can be included in only one study with proper probabilities. This was accomplished by partitioning the frame into the following three groups shown in order as in table 2 of the paper. The four groups were as follows:

- schools not selected for either the TIMSS national or NAEP Alpha samples;
- schools selected for the NAEP Alpha sample and not the TIMSS national sample;

- schools selected for the TIMSS national sample and not the NAEP Alpha sample; and
- schools selected for the TIMSS national sample and the NAEP Alpha sample.

With this design, the method accomplished the goal of selecting all the state sample from group 1 and none from the other groups. For the schools in groups 3 and 4, this was due to the sum of the school's probabilities of being selected for the state sample and the national sample was always less than one. In that case, their conditional probabilities are zero.

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3. Participation Rates and Nonresponse Bias

To minimize the potential for response biases, IEA developed participation or response rate standards that apply to all participating education systems and govern whether or not data are included in the TIMSS and PIRLS 2011 international datasets and the way in which aggregate statistics are presented in the international reports. These standards were set using composites of participation rates at the school, classroom, and student levels, and were calculated with and without the inclusion of substitute schools that were selected to replace schools refusing to participate.

The standards take the following two forms, distinguished primarily by whether or not meeting the school participation rate of 85 percent requires the counting of substitute schools:

Category 1: Met requirements. Participants that meet all of the following conditions are considered to have fulfilled the IEA requirements:

Obtain an unweighted school response rate of at least 85 percent without replacement (rounded to nearest whole percent) AND an unweighted student response rate (after rounding) of at least 85 percent

OR

A weighted school response rate of at least 85 percent without replacement (rounded to nearest whole percent) AND a weighted student response rate (after rounding) of at least 85 percent

OR

The product of the (unrounded) weighted school response rate without replacement and the (unrounded) weighted student response rate of at least 75 percent (after rounding to the nearest whole percent).

Participants in this category appear in the tables and figures in international reports without annotation, and are ordered by achievement score.

Category 2: Met requirements after substitutes. In the case of participants not meeting the category 1 requirements, but who had a weighted school response rate of at least 50 percent without replacement (after rounding to the nearest percent) AND HAD EITHER:

A weighted school response rate of at least 85 percent with replacement (after rounding to nearest whole percent) AND a weighted student response rate (after rounding) of at least 85 percent.

OR

The product of the (unrounded) weighted school response rate with replacement and the (unrounded) weighted student response rate of at least 75 percent (after rounding to the nearest whole percent).

Those participants able to satisfy only the category 2 standard are included in the tables and figures as well but are annotated to indicate their response rate status.

Category 3: Unacceptable sampling response rate even when replacement schools are included.

Participants that could provide documentation to show that they complied with TIMSS and PIRLS sampling procedures and requirements but did not meet the requirements for Category 1 or Category 2 were placed in Category 3. Participants in this category appeared in a separate section of the achievement tables, below the other participants, in international reports. These countries were presented in alphabetical order.

3.1 TIMSS and PIRLS Participation Rates of U.S. Schools, Classrooms, and Students

The raw numbers on which the various participation rates are based, along with the participation rates themselves, are shown in table 3-1 separately for the TIMSS fourth-grade and eighth-grade national samples and table 3-2 for the PIRLS national sample. Participation rates for the state samples are shown in appendix B.

To explain how to interpret these participation rates, subsections 3.1.1 through 3.1.3 describe a complete interpretation of the TIMSS fourth-grade numbers. The participation rates for TIMSS eighth-grade, PIRLS, and all the state samples can be interpreted in the same way.

Table 3-1. Number of U.S. schools, classrooms, and students participating in TIMSS, and participation rates, by grade: 2011

Item	Number		Rates			
			Grade 4		Grade 8	
	Grade 4	Grade 8	Unweighted	Weighted	Unweighted	Weighted
Schools						
Sampled	450	600				
Excluded and ineligible	13	26				
Eligible	437	574				
Participating	347	499	79	79	87	87
Substitutes	22	2				
Participating (all schools)	369	501	84	84	87	87
Classrooms in participating schools						
Total	1,674	5,199				
Excluded	72	536				
Eligible	1,602	4,663				
Sampled	623	557				
Participating	623	557	100	100	100	100
Students in participating schools						
Sampled	14,205	11,864				
Excluded	839	398				
Withdrawn	185	302				
Eligible	13,181	11,164				
Absent	612	687				
Assessed	12,569	10,477	95	95	94	94

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools since substitute schools do not have an independent probability of selection (National Center for Education Statistics 2002). However, the participation rates shown in this table are those reported by TIMSS and do include substitute schools in the calculations.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-2. Number of U.S. schools, classrooms, and students participating in PIRLS, and participation rates, for fourth-grade: 2011

	Number	Rates	
		Unweighted	Weighted
Schools			
Sampled	450		
Excluded and ineligible	13		
Eligible	437		
Participating	349	80	80
Substitutes	21		
Participating (all schools)	370	80	85
Classrooms in participating schools			
Total	1,674		
Excluded	72		
Eligible	1,602		
Sampled	618		
Participating	618	100	100
Students in participating schools			
Sampled	14,253		
Excluded	830		
Withdrawn	169		
Eligible	13,254		
Absent	528		
Assessed	12,726	96	96

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools since substitute schools do not have an independent probability of selection (National Center for Education Statistics 2002). However, the participation rates shown in this table are those reported by PIRLS and do include substitute schools in the calculations.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Interpreting School Participation Rates (TIMSS Fourth Grade Example)

The fourth-grade school sample consisted of 450 schools and was designed to yield a representative school sample for TIMSS and PIRLS, as both assessments were administered within the same schools. Thirteen ineligible schools were identified on the basis that they served special student populations or had closed or altered their grade makeup since the sampling frame was developed. This left 437 eligible schools, of which 347 agreed to participate. The fourth-grade school participation rate before substitution was 79 percent (unweighted). The analogous weighted school participation rate was also 79 percent.

In addition to the 347 participating schools from the original sample, 22 substitute schools also participated for a total of 369 participating schools at the fourth grade in the United States. This gave a weighted (and unweighted) school participation rate after substitution of 84 percent.

Interpreting Classroom Participation Rates (TIMSS Fourth Grade Example)

In accord with the international requirements, schools agreeing to participate were asked to list their fourth-grade mathematics classes as the basis for sampling at the classroom level. Schools appeared to be able to identify classes in this way without any problems. A total of 1,674 mathematics classrooms were identified as a result. At this time, schools were given the opportunity to identify special classes—classes containing all, or a majority of, students with intellectual and/or functional disabilities, or students who were non-native-language speakers. While these classes were regarded as eligible, the students as a group were treated as excluded since, in the opinion of the school, their disabilities or language capabilities would render meaningless their performance on the assessment. A total of 72 classrooms were excluded in this way. This left a pool of 1,602 eligible classrooms from which the sample was drawn. While the students in these excluded classrooms did not figure in the participation rate calculations, they did count in the population coverage calculations, and this is reflected in the higher exclusion rate for the U.S. In the international report the U.S. is annotated to reflect this fact.

Classrooms with fewer than 15 students were collapsed into pseudoclassrooms prior to sampling so that each eligible classroom in a school had at least 20 students. Two classrooms (pseudoclassrooms) were selected per school where possible. In schools where there was only one classroom, this classroom was selected with certainty. Some 623 classrooms were selected as a result of this process, and all participated in TIMSS. Weighted and unweighted classroom participation rates were 100 percent.

Subsequently, schools were asked to list the students in each of the 623 sampled classrooms at the fourth grade, along with the teachers who taught mathematics and science to these students. At this time, schools were given the opportunity to identify particular students not suited to take the test because of functional and/or intellectual disabilities and/or because they were non-native language speakers (students with disabilities or non-native-language speakers who had been mainstreamed; see definitions in section 3.3).

Interpreting Student Participation Rates (TIMSS Fourth Grade Example)

A total of 14,205 fourth-grade students were listed as being in these classrooms. (In mixed-grade classrooms only students in the target population were considered.) At the outset, 839 of these were excluded because of functional/intellectual disabilities or because they were non-native language speakers. Additionally, in the months between the listing of students and the time of the assessment, 185 students were classified as withdrawn, as they were no longer in the school/classroom at the time of the assessment. As a consequence, 13,181 students were considered eligible to take the assessment. On the day of the assessment some 612 students were absent, leaving 12,569 students who completed a TIMSS 2011 assessment booklet. Participation rates are calculated on the number of eligible students (13,181). Since 12,569 of the 13,181 eligible students were assessed, the weighted (and unweighted) student participation rate was 95 percent.

Combined Participation Rates

The combined school, classroom, and student weighted participation rate standard of 75 percent used by TIMSS and PIRLS in situations in which it was necessary to recruit substitute schools was met for all grade samples in TIMSS and PIRLS 2011. Both the weighted and unweighted product of the separate participation rates for TIMSS at grade 4 was 80 percent (82 percent for both TIMSS at grade 8 and PIRLS). The application of international guidelines means, however, that U.S. statistics describing fourth-grade students in TIMSS and PIRLS are annotated in international reports to indicate that coverage of the defined student population was less than the IEA standard of 95 percent and that participation rates were met only after substitute schools were included.

3.2 Participation Rates for All Countries

For comparable fourth- and eighth-grade school, classroom, and student participation rates in other nations in TIMSS, see exhibits C-2. through C-9 in appendix C of Martin et. al. (2012) and, for PIRLS see exhibits C-2. through C-9 in appendix C of Mullis et. al. (2012).

3.3 Exclusions

The national defined target population is described in *Sample Design in TIMSS and PIRLS* (Joncas & Foy, 2013). All schools and students excluded from this population are referred to as the “excluded population.” Exclusions could occur at the school level, with entire schools being excluded, or within schools, with specific students or entire classrooms excluded. TIMSS 2011 and PIRLS 2011 did not provide accommodations for students with disabilities or students who were unable to read or speak the language of the test.

School Exclusions

Countries could exclude schools that

- were geographically inaccessible;
- were of extremely small size;
- offered a curriculum or school structure radically different from the mainstream educational system; or
- provided instruction only to students in the excluded categories defined under “within-school exclusions,” such as schools for the blind.

Within-School Exclusions

Countries were asked to adapt the following international within-school exclusion rules to define excluded students:

Students with intellectual disabilities. Students who, in the professional opinion of the school principal or other qualified staff members, were considered to be intellectually disabled or who had been tested psychologically as such. This included students who were emotionally or mentally unable to follow even the general instructions of the test. Students were not to be excluded solely because of poor academic performance or normal disciplinary problems.

Students with functional disabilities. Students who were permanently physically disabled in such a way that they could not perform in the TIMSS or PIRLS testing situation. Functionally disabled students who were able to respond were included in the testing.

Non-native-language speakers. Students who were unable to read or speak the language(s) of the test and were unable to overcome the language barrier of the test. Typically, a student who had received less than 1 year of instruction in the language(s) of the test was excluded.

Exclusions in the U.S. National Samples

As noted earlier, schools were given the opportunity to exclude any special classes among the total number of classes in the fourth or eighth grade. These classes were made up largely of students with functional or intellectual disabilities or students who were non-native-language speakers, as defined above. Classes identified in this way were excluded from the class sampling procedure. Subsequently, schools were given the opportunity to exclude students from the sampled classes—essentially, students with functional or intellectual disabilities, or non-native-language speaking students in the United States who had been mainstreamed.

These procedures resulted in a (weighted) student exclusion rate of 7.0 percent in the fourth grade for TIMSS, 7.3 percent for PIRLS, and 7.2 percent for TIMSS in the eighth grade, based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (93 percent for TIMSS at both fourth and eighth grade and PIRLS) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show the United States annotated to indicate this fact.

Exclusion information for the state samples can be found on appendix B.

3.4 Nonresponse Bias Analysis

The National Center for Education Statistics (NCES) standards for assessment surveys stipulate that a nonresponse bias analysis is required at any stage of data collection with a weighted unit response rate of less than 85 percent (without substitution) at both grades. Because the U.S. TIMSS and PIRLS 2011 weighted school response rates at grade 4 are below 85 percent, NCES required an investigation into the potential magnitude of nonresponse bias at the school level in the U.S. samples, which is the focus of this section. Neither the U.S. TIMSS grade 8 nor any of the benchmarking states required a nonresponse bias analysis be performed because their weighted school and student participation rates were above 85 percent.

Methodology

To measure the potential nonresponse bias at the school level, the characteristics of participating schools were compared to those of the total eligible sample of schools. The alternative of comparing participants to nonparticipants, while resulting in the same tests of significance, makes it more difficult to judge the potential for bias. This analysis is similar to other NCES nonresponse bias studies on the 2003 TIMSS (Ferraro & Van de Kerckhove, 2006).

The analysis for each sample (TIMSS Grade 4 and PIRLS Grade 4) was conducted in three parts as follows:

Analysis of original respondent sample: The distribution for TIMSS of the responding (participating) original school sample (N = 347) was compared with that of the total eligible original school sample (N = 437). The distribution for PIRLS of the responding (participating) original school sample (N = 349) was compared with that of the total eligible original school sample (N = 437). The original sample is the sample before substitution. In each sample, schools were weighted by their school base weights that did not include a nonresponse adjustment factor. The base weight for each original school was the reciprocal of its selection probability.

Analysis of respondent sample with substitutes (final sample): The distribution for TIMSS of the responding (participating) sample with substitutes (N = 369), was compared to the total eligible final sample (N = 437). The distribution for PIRLS of the responding (participating) sample with substitutes (N = 370), was compared to the total eligible final sample (N = 437). The final sample is the sample after substitution. Again, school base weights were used for both the eligible sample and the participating schools. The base weight for each substitute school was set to the base weight of the original school that it replaced.

Analysis of the nonresponse adjusted sample with substitutes: As done in the second analysis, the same sets of schools were compared (i.e., N = 369 vs. N = 437 for TIMSS, N = 370 vs. N = 437 for PIRLS), but, this time, when analyzing the responding schools alone, school nonresponse adjustments were applied to the weights. The international weighting procedures created a nonresponse adjustment class¹³ for each explicit stratum. For U.S. TIMSS grade 4, or “TIMSS-4,” and U.S. PIRLS grade 4, or

¹³In general, nonresponse adjustment classes are formed based on characteristics related to response rates or to values of survey estimates where respondents and nonrespondents are similar within each class. The nonresponse adjustment is applied within each of these classes.

“PIRLS-4,” 12 explicit strata were formed by poverty level, school control, and Census region, thus forming 12 adjustment classes.

The first analysis indicates the potential for nonresponse bias that was introduced through school nonresponse. The second analysis suggests the remaining potential for nonresponse bias after the mitigating effects of substitution have been accounted for. The third analysis indicates the potential for bias after accounting for the mitigating effects of both substitution and nonresponse weight adjustments. Both the second and third analyses, however, may provide an overly optimistic scenario because even though substitution and nonresponse adjustments may correct somewhat for deficiencies in the few characteristics examined here, there is no guarantee that they are equally as effective for other characteristics, and in particular for student achievement.

To compare participants and the total eligible sample, the sample of schools was matched to the sample frame to compare as many characteristics as possible that might provide information about the presence of nonresponse bias. Since the analyses involve both participating and nonparticipating schools, they are based, out of necessity, on data from the sampling frame as TIMSS and PIRLS data are not available for nonparticipating schools. Comparing frame characteristics for participants and the total eligible sample is not an ideal measure of nonresponse bias if the characteristics are unrelated or weakly related to more substantive items in the survey; however, this is often the only approach available.

Frame characteristics for public schools were taken from the 2007–08 Common Core of Data (CCD) and, for private schools, from the 2007–08 Private School Survey (PSS).

The following categorical variables were available in the sampling frame for all schools:

School control. Indicates whether the school is under public control (operated by publicly elected or appointed officials) or private control (operated by privately elected or appointed officials and derives its major source of funds from private sources);

Community type. The location of a school relative to populous areas, i.e., city, suburban, town, rural;

Region. Census region (see section 3.5 for state listing); and

Poverty level.¹⁴ For public schools, a *high poverty school* is defined as one in which 50 percent or more of the students are eligible for the free or reduced-price lunch (FRPL) program, and a *low poverty school* is defined as one in which less than 50 percent are eligible; all private schools are treated as low-poverty schools.

The following continuous variables were available in the sampling frame for all schools:

- number of grade 4 students enrolled;
- total number of students; and
- percentage of students in five race/ethnicity categories (White, non-Hispanic; Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native).¹⁵

An additional continuous variable, the percentage of students eligible to participate in the FRPL, was available only for public schools. “Poverty level” variable mentioned among the categorical variable is the recoded version of this continuous variable.

For categorical variables, the distribution of frame characteristics for participants was compared with the distribution for all eligible schools. The hypothesis of independence between the characteristic and participation status was tested using a Rao-Scott modified chi-square statistic at the 5 percent level (Rao & Thomas, 2003). For continuous variables, summary means were calculated, and the difference between means was tested using a *t* test. The statistical significance of differences between participants and the total eligible sample is identical to that which would result from comparing participants and nonparticipants, since all significance tests account for the fact that the participants are a subset of the full sample. The bias and relative bias are also given in each table. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. The relative bias is a measure of the size of the bias compared to the eligible sample estimate.

In addition to these tests, logistic regression models were used to provide a multivariate analysis in which the conditional independence of these school characteristics as predictors of participation was examined. It may be that only one or two variables are actually related to participation status. However, if these

¹⁴The sample frame did not contain a direct measure of poverty. No free or reduced-price lunch (FRPL) program data were available for private schools.

¹⁵Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible.

variables are also related to the other variables examined in the analyses, then other variables, which are not related to participation status, will appear as significant in simple bivariate tables. Dummy variables were created for each component of the categorical variables so that each component was included separately. The last component of each categorical variable is always the reference category and is not included in the model explicitly. The p value of a dummy variable indicates whether there is a significant difference at the 5 percent level from the effect of the (omitted) reference category. It is not possible to include all the frame characteristics in a single model because the five race/ethnicity variables are linearly dependent (i.e., they sum up to 100 percent for every school). Therefore, two models were used. In the first model, four race/ethnicities (Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native) were included in the model with percentage White, non-Hispanic as the reference category. In addition, an F test was used to determine whether the parameter estimates of these four characteristics were simultaneously equal to zero. In the second model, the summed percentage of the four race/ethnicities (Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native) replaced the four race/ethnicity variables with percentage White, non-Hispanic again as the reference category. All other frame characteristics were included in both models.

The logistic regression was performed using WesVar (Westat, 2007) (http://www.westat.com/expertise/information_systems/WesVar/index.cfm) with replicate weights to properly account for the complex sample design. The paired jackknife replication method was used to create the replicate weights (Brick, Morganstein, & Valliant, 2000).

Results for Original Respondent Sample—TIMSS Fourth Grade

This section presents the results of the nonresponse bias analysis, based exclusively on the original sample of 437 eligible U.S. schools for TIMSS-4 (section 3.4.6 presents the results for PIRLS). The distribution of the responding original school sample was compared with that of the total eligible original school sample using base weights in each case. All original schools in the sample that declined to participate in the survey were treated as nonparticipants regardless of whether they were substituted by a substitute school. The weighted and unweighted response rates were 79 percent, with 347 out of 437 eligible schools participating. See table 3-1 for details on the TIMSS-4 school participation rates.

Categorical variables (TIMSS-4). The distribution of participating and eligible schools in the U.S. TIMSS-4 sample by the four characteristics is shown in table 3-3. Based on these analyses, the chi-square statistics for school control and community type are significant and suggests that there is evidence of relationships with participating in the assessment. In particular, public schools were overrepresented

among participating schools (96.3 vs. 91.3 percent, respectively), and private schools were underrepresented among participating schools (3.7 vs. 8.7 percent, respectively). Similarly, schools in cities were underrepresented among participating schools relative to eligible schools (26.8 vs. 30.2 percent, respectively), while schools in rural areas were overrepresented among participating schools (24.2 vs. 22.6 percent, respectively). There are no statistically significant relationships between participation status and any of the other characteristics shown in table 3-3.

Table 3-3. Percentage distribution of eligible and participating schools in the U.S. TIMSS fourth-grade original sample, by selected categorical variables: 2011

School characteristic	Sample schools		Bias	Relative bias	Chi-square <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 347)			
School control					0.000
Public	91.3	96.3	4.92	0.054	
Private	8.7	3.7	-4.92	-0.568	
Community type					0.010
City	30.2	26.8	-3.44	-0.114	
Suburban	35.5	36.3	0.80	0.023	
Town	11.7	12.7	0.99	0.085	
Rural	22.6	24.2	1.65	0.073	
Region					0.237
Northeast	16.4	15.4	-1.00	-0.061	
Midwest	21.2	20.5	-0.70	-0.033	
South	38.4	40.7	2.31	0.060	
West	24.0	23.4	-0.60	-0.025	
Poverty level					0.870
High	39.9	40.1	0.18	0.004	
Low	60.1	59.9	-0.18	-0.003	

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Continuous variables (TIMSS–4). Summary means for each continuous variable for participating and eligible schools are shown in tables 3-4 through 3-6. Twenty-four of the 399 public schools had a missing value for the free or reduced-price lunch variable; these schools were excluded from the analysis.

Participating schools had a higher mean fourth-grade enrollment than the eligible sample (99.3 vs. 94.0, respectively; table 3-4). Participating schools had a lower mean percentage than the eligible sample of Black, non-Hispanic students (13.3 vs. 15.3 percent, respectively; table 3-5). Participating schools had a higher mean percentage than the eligible sample Hispanic students (25.1 vs. 23.5 percent, respectively; table 3-5) and American Indian or Alaska Native students (0.9 vs. 0.8 percent, respectively; table 3-5). There were no statistically significant differences detected between the participating and eligible public schools for the free or reduced-price lunch (table 3-6). However, this must be interpreted with caution because this variable was missing for 24 public schools (see note in table 3-6).

Table 3-4. Mean enrollment of eligible and participating schools in the U.S. TIMSS fourth-grade original sample: 2011

	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (mean) (N = 437)	Participating (mean) (N = 347)			
Student enrollment					
Total school	561.3	570.1	8.74	0.016	0.193
Fourth grade	94.0	99.3	5.31	0.056	0.000

NOTE: Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-5. Mean percentage of students in eligible and participating schools in the U.S. TIMSS fourth-grade original sample, by race/ethnicity: 2011

Race/ethnicity	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 347)			
White, non-Hispanic	55.9	56.2	0.28	0.005	0.761
Black, non-Hispanic	15.3	13.3	-2.00	-0.131	0.015
Hispanic	23.5	25.1	1.66	0.071	0.011
Asian or Pacific Islander	4.5	4.5	-0.04	-0.010	0.766
American Indian or Alaska Native	0.8	0.9	0.11	0.133	0.033

NOTE: Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-6. Mean percentage of students eligible for free or reduced-price lunch, in eligible and participating public schools in the U.S. TIMSS fourth-grade original sample: 2011

Students	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 375)	Participating (percent) (N = 313)			
Percentage of students eligible for free or reduced-price lunch	48.1	47.2	-0.90	-0.019!	0.170!

! Interpret data with caution.

NOTE: Information on percentage of students eligible for free or reduced-price lunch is missing for 24 of the 399 public schools in the original sample and 21 of the 334 public schools that participated. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Logistic regression model (TIMSS-4). To examine the joint relationship of various characteristics to school nonresponse, the analysis utilized a logistic regression model with participation status as the binary dependent variable and frame characteristics as predictor variables. Public and private schools were modeled together using the variables available for all schools.

Standard errors and tests of hypotheses for the full model parameter estimates are presented in tables 3-7a (with four race/ethnicity variables) and 3-7b (with summed race/ethnicity percentage). Private schools, South region, total school enrollment, fourth-grade enrollment, the percentage of Hispanic students, and the percentage of American Indian or Alaska Native students are significant predictors of school participation in table 3-7a. The negative parameter estimates indicate that, relative to public schools, private schools were somewhat underrepresented among the participating schools, and the total enrollment in participating schools was slightly smaller than in all eligible schools, i.e., the smaller the total enrollment, the more likely a school was to participate. The positive parameter estimates indicate that, relative to schools in the West region, schools in the South region were somewhat overrepresented among the participating schools, and the fourth-grade enrollment, percentage of Hispanic students, and percentage of American Indian or Alaska Native students in participating schools was larger than in all eligible schools. The F test statistic to determine whether the race/ethnicity characteristics are simultaneously equal to 0 was 2.86 with a p value of 0.0023, which indicates a significant relationship detected with participation.

Private schools, total school enrollment, and fourth-grade enrollment again are significant predictors of school participation in table 3-7b. This model also shows that the summed race/ethnicity percentage is not significantly related to participation.

Table 3-7a. Logistic regression model parameter estimates (with four race/ethnicity variables) using the U.S. TIMSS fourth-grade original sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	<i>t</i> test for H ₀ : parameter = 0	<i>p</i> value
Intercept	1.942	0.3693	5.2575	0.0000
City	-0.436	0.4149	-1.0521	0.2961
Suburban	-0.116	0.3450	-0.3351	0.7385
Town	0.076	0.5896	0.1287	0.8979
Private school	-2.302	0.5561	-4.1393	0.0001
High poverty	-0.643	0.3298	-1.9491	0.0550
Northeast	0.416	0.4341	0.9573	0.3415
Midwest	0.421	0.3719	1.1318	0.2613
South	1.099	0.4354	2.5237	0.0137
Total school enrollment	-0.002	0.0007	-2.6538	0.0097
Fourth-grade enrollment	0.012	0.0056	2.1574	0.0342
Black, non-Hispanic	-0.011	0.0060	-1.8377	0.0701
Hispanic	0.015	0.0072	2.0644	0.0424
Asian or Pacific Islander	-0.002	0.0165	-0.1442	0.8857
American Indian or Alaska Native	0.251	0.1063	2.3621	0.0208

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor. SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-7b. Logistic regression model parameter estimates (with summed race/ethnicity percentage) using the U.S. TIMSS fourth-grade original sample (N=437): 2011

Parameter	Parameter estimate	Standard error	<i>t</i> test for H ₀ : parameter = 0	<i>p</i> value
Intercept	2.300	0.3801	6.0513	0.0000
City	-0.586	0.4289	-1.3653	0.1763
Suburban	-0.179	0.4145	-0.4328	0.6664
Town	0.134	0.5614	0.2378	0.8127
Private school	-1.934	0.5480	-3.5289	0.0007
High poverty	-0.509	0.3546	-1.4364	0.1550
Northeast	-0.189	0.4172	-0.4518	0.6527
Midwest	-0.113	0.3572	-0.3164	0.7526
South	0.382	0.3218	1.1867	0.2391
Total school enrollment	-0.002	0.0007	-2.2225	0.0293
Fourth-grade enrollment	0.014	0.0065	2.1496	0.0348
Summed race/ethnicity percentage	0.002	0.0059	0.3215	0.7487

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Summed race/ethnicity percentage includes Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Results for Respondent Sample With Substitutes (Final Sample) —TIMSS Fourth Grade

This section presents the nonresponse bias analysis based on the final sample of 437 eligible schools for TIMSS-4. The distribution of the responding sample, including participating substitutes, was compared to the total eligible final sample. School base weights were used for both the eligible sample and the participating schools. Only eligible original schools that refused and were not successfully replaced by a substitute were treated as nonparticipants. All other eligible original sample schools were treated as participating. Through the use of substitutes, the weighted and unweighted school response rates for TIMSS-4 were 84 percent, with 369 out of 437 schools participating.

Categorical variables (TIMSS-4). The distribution of participating and eligible schools by the four characteristics is shown in table 3-8. Only school control was found to be statistically significant among the categorical variables. In particular, public schools were overrepresented among participating schools

(96.2 vs. 91.3 percent, respectively), and private schools were underrepresented among participating schools (3.8 vs. 8.7 percent, respectively). These differences were slightly smaller than that shown in table 3-3, in which only the original sample was considered. Thus while there is no evidence that the use of substitute schools eliminated the potential for bias, as indicated by this variable, it certainly has also not added to it. There are no statistically significant relationships detected between participation status and the other characteristics shown in table 3-8.

Table 3-8. Percentage distribution of eligible and participating schools in the U.S. TIMSS fourth-grade final sample, by selected categorical variables: 2011

School characteristic	Sample schools		Bias	Relative bias	Chi-square <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 369)			
School control					0.000
Public	91.3	96.2	4.88	0.053	
Private	8.7	3.8	-4.88	-0.564	
Community type					0.155
City	30.2	28.2	-2.06	-0.068	
Suburban	35.5	36.0	0.54	0.015	
Town	11.7	12.2	0.50	0.043	
Rural	22.6	23.6	1.02	0.045	
Region					0.630
Northeast	16.4	15.5	-0.82	-0.050	
Midwest	21.2	20.9	-0.29	-0.014	
South	38.4	39.1	0.70	0.018	
West	24.0	24.5	0.41	0.017	
Poverty level					0.271
High	39.9	41.0	1.04	0.026	
Low	60.1	59.0	-1.04	-0.017	

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Continuous variables (TIMSS-4). Summary means for each continuous variable for participating and eligible schools are shown in tables 3-9 through 3-11. Twenty-four of the 399 public schools had a missing value for the free or reduced-price lunch variable; these schools were excluded from the analysis.

Participating schools had a higher mean fourth-grade enrollment than the eligible sample (99.1 vs. 94.0, respectively; table 3-9). Participating schools had a lower mean percentage than the eligible sample of Black, non-Hispanic students (13.4 vs. 15.2 percent, respectively; table 3-10). Participating schools had a higher mean percentage than the eligible sample Hispanic students (25.0 vs. 23.1 percent, respectively; table 3-10) and American Indian or Alaska Native students (1.0 vs. 0.9 percent, respectively; table 3-10). The difference in the fourth-grade enrollment was slightly smaller than that shown in table 3-4, in which only the original sample was considered. The differences in the percentage of students who are Black, non-Hispanic and Hispanic are somewhat smaller than that shown in table 3-5, in which only the original sample was considered. Thus, as in the case with school control, while there is no evidence that the use of substitute schools substantially reduced the potential for bias, as indicated by these variables, it has also not added to it.

There was no statistically significant difference detected between the participating and eligible public schools for free or reduced-price lunch (table 3-11). However, this must be interpreted with caution because the variable is missing for 24 schools.

Table 3-9. Mean enrollment of eligible and participating schools in the U.S. TIMSS fourth-grade final sample: 2011

	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (mean) (N = 437)	Participating (mean) (N = 369)			
Student enrollment					
Total school	562.2	572.3	10.05	0.018	0.105
Fourth grade	94.0	99.1	5.08	0.054	0.000

NOTE: Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-10. Mean percentage of students in eligible and participating schools in the U.S. TIMSS fourth-grade final sample, by race/ethnicity: 2011

Race/ethnicity	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N=437)	Participating (percent) (N = 369)			
White, non-Hispanic	56.2	55.9	-0.32	-0.01	0.690
Black, non-Hispanic	15.2	13.4	-1.77	-0.12	0.024
Hispanic	23.1	25.0	1.89	0.08	0.001
Asian or Pacific Islander	4.7	4.8	0.09	0.02	0.426
American Indian or Alaska Native	0.9	1.0	0.10	0.12	0.008

NOTE: Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-11. Mean percentage of students eligible for free or reduced-price lunch, in eligible and participating public schools in the U.S. TIMSS fourth-grade final sample: 2011

Students	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 375)	Participating (percent) (N = 333)			
Percentage of students eligible for free or reduced-price lunch	47.9	47.2	-0.70	-0.015	0.217

NOTE: Information on percentage of students eligible for free or reduced-price lunch is missing for 24 of the 399 public schools in the final sample and 22 of the 355 public schools that participated. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Logistic regression model (TIMSS-4). To examine the joint relationship of various characteristics to school nonresponse, the analysis utilized a logistic regression model with participation status as the binary dependent variable and frame characteristics as predictor variables. Six schools were excluded from the analysis due to missing information for race/ethnicity and total school enrollment.

Private schools, total school enrollment, and the percentage of American Indian or Alaska Native students remained significant predictors of school participation in table 3-12a. The negative parameter estimates indicate that, relative to public schools, private schools were somewhat underrepresented among the participating schools, and the total enrollment in participating schools was smaller than in all eligible schools, i.e., the smaller the total enrollment, the more likely a school was to participate. The positive parameter estimates indicate that, the percentage of American Indian or Alaska Native students in participating schools was lower than in all eligible schools. The F test statistic to determine whether the race/ethnicity characteristics are simultaneously equal to 0 was 2.66 with a p value of 0.0042, which indicates a significant relationship detected with participation.

Private schools, total school enrollment, and fourth-grade enrollment were also significant predictors of school participation in table 3-12b. This model also shows that the summed race/ethnicity percentage is not significantly related to participation.

Table 3-12a. Logistic regression model parameter estimates (with four race/ethnicity variables) in the U.S. TIMSS fourth-grade final sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	t test for H_0 : parameter = 0	p value
Intercept	2.017	0.6166	3.2707	0.0016
City	-0.293	0.5195	-0.5646	0.5740
Suburban	-0.132	0.4447	-0.2971	0.7672
Town	-0.128	0.6554	-0.1959	0.8452
Private school	-2.375	0.6501	-3.6535	0.0005
High poverty	-0.429	0.4614	-0.9292	0.3558
Northeast	0.348	0.5340	0.6516	0.5167
Midwest	0.509	0.5740	0.8860	0.3784
South	0.757	0.5049	1.4985	0.1382
Total school enrollment	-0.002	0.0011	-2.2424	0.0279
Fourth-grade enrollment	0.020	0.0108	1.8537	0.0677
Black, non-Hispanic	-0.013	0.0067	-1.9456	0.0554
Hispanic	0.018	0.0112	1.6252	0.1083
Asian or Pacific Islander	0.001	0.0155	0.0773	0.9386
American Indian or Alaska Native	0.290	0.1337	2.1705	0.0331

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-12b. Logistic regression model parameter estimates (with summed race/ethnicity percentage) in the U.S. TIMSS fourth-grade final sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	<i>t</i> test for H ₀ : parameter = 0	<i>p</i> value
Intercept	2.522	0.6195	4.0702	0.0001
City	-0.496	0.5331	-0.9312	0.3547
Suburban	-0.205	0.4553	-0.4508	0.6535
Town	-0.093	0.6003	-0.1551	0.8771
Private school	-1.864	0.6465	-2.8824	0.0051
High poverty	-0.376	0.4544	-0.8266	0.4111
Northeast	-0.430	0.5191	-0.8282	0.4102
Midwest	-0.226	0.4590	-0.4921	0.6241
South	-0.149	0.3795	-0.3916	0.6965
Total school enrollment	-0.002	0.0011	-2.2352	0.0284
Fourth-grade enrollment	0.024	0.0113	2.1027	0.0389
Summed race/ethnicity percentage	0.002	0.0073	0.2773	0.7823

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Summed race/ethnicity percentage includes Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Results for Nonresponse-Adjusted Sample With Substitutes (Nonresponse-Adjusted Sample)—TIMSS Fourth Grade

This section presents the nonresponse bias analysis based on the final sample of 437 eligible schools for TIMSS-4. The distribution of the responding sample, including participating substitutes, was compared to the total eligible final sample, just like the previous section. However, in this section, school base weights were used for the eligible sample of schools, whereas nonresponse-adjusted weights were used for the participating schools. Only eligible original schools that refused and were not successfully replaced by a substitute were treated as nonparticipants. All other eligible original sample schools were treated as participating.

Categorical variables (TIMSS-4). The distribution of participating and eligible schools by the four characteristics is shown in table 3-13. Only region was found to be statistically significant among the categorical variables. In particular, schools in the South and West regions were underrepresented among

participating schools relative to eligible schools (37.8 vs. 38.4 and 23.5 vs. 24.0 percent, respectively), while schools in the Midwest region were overrepresented among participating schools relative to eligible schools (22.4 vs. 21.2 percent, respectively).

Table 3-13. Percentage distribution of eligible and participating schools in the U.S. TIMSS fourth-grade nonresponse-adjusted sample, by selected categorical variables: 2011

School characteristic	Sample schools		Bias	Relative bias	Chi-square <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 369)			
School control					0.995
Public	91.3	91.3	0.00	0.000	
Private	8.7	8.7	0.00	0.000	
Community type					0.468
City	30.2	29.1	-1.09	-0.036	
Suburban	35.5	35.9	0.36	0.010	
Town	11.7	12.3	0.63	0.054	
Rural	22.6	22.7	0.10	0.004	
Region					0.009
Northeast	16.4	16.4	0.01	0.000	
Midwest	21.2	22.4	1.15	0.054	
South	38.4	37.8	-0.56	-0.015	
West	24.0	23.5	-0.60	-0.025	
Poverty level					0.863
High	39.9	39.9	-0.06	-0.002	
Low	60.1	60.1	0.06	0.001	

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Continuous variables (TIMSS-4). Summary means for each continuous variable for participating and eligible schools are shown in tables 3-14 through 3-16. Twenty-four of the 399 public schools had a missing value for the free or reduced-price lunch variable; these schools were excluded from the analysis.

There were no statistically significant enrollment differences detected between participating and eligible schools (table 3-14). The only remaining significant difference for race/ethnicity was for Black, non-Hispanic students where participating schools had a lower mean percentage than the eligible sample of (13.0 vs. 15.2 percent, respectively; table 3-15). The difference in the percentage of students who are Black, non-Hispanic was somewhat larger than that shown in table 3-10, in which only the original sample was considered.

There was no statistically significant difference detected between the participating and eligible public schools for free or reduced-price lunch (table 3-16). However, this must be interpreted with caution because the variable is missing for 24 schools.

Table 3-14. Mean enrollment of eligible and participating schools in the U.S. TIMSS fourth-grade nonresponse-adjusted sample: 2011

	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (mean) (N = 437)	Participating (mean) (N = 369)			
Student enrollment					
Total school	562.2	558.0	-4.29	-0.008	0.654
Fourth grade	94.0	95.4	1.32	0.014	0.349

NOTE: Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse-adjusted weight.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-15. Mean percentage of students in eligible and participating schools in the U.S. TIMSS fourth-grade nonresponse-adjusted sample, by race/ethnicity: 2011

Race/ethnicity	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 369)			
White, non-Hispanic	56.2	56.3	0.03	0.00	0.974
Black, non-Hispanic	15.2	13.0	-2.20	-0.14	0.037
Hispanic	23.1	24.9	1.86	0.08	0.097
Asian or Pacific Islander	4.7	4.7	0.01	0.00	0.980
American Indian or Alaska Native	0.9	1.2	0.29	0.32	0.156

NOTE: Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table 3-16. Mean percentage of students eligible for free or reduced-price lunch, in eligible and participating public schools in the U.S. TIMSS fourth-grade nonresponse-adjusted sample: 2011

Students	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 375)	Participating (percent) (N = 333)			
Percentage of students eligible for free or reduced-price lunch	47.9	47.6	-0.30	-0.006	0.742

NOTE: Information on percentage of students eligible for free or reduced-price lunch is missing for 24 of the 399 public schools in the final sample and 22 of the 355 public schools that participated. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Summary—TIMSS Fourth Grade

The results of the fourth-grade analyses are summarized in table 3-17.

Table 3-17. Characteristics with p values less than .05, U.S. TIMSS fourth-grade schools: 2011

Analysis	Characteristics with p values less than .05
Original sample	School control; community type; fourth-grade enrollment; Black, non-Hispanic; Hispanic; American Indian or Alaska Native
Model a	Private school; South region; total school enrollment; fourth-grade enrollment; Hispanic; American Indian or Alaska Native
Model b	Private school; total school enrollment; fourth-grade enrollment
Sample with substitutes	School control; fourth-grade enrollment; Black, non-Hispanic; Hispanic; American Indian or Alaska Native
Model a	Private school; total school enrollment; American Indian or Alaska Native
Model b	Private school; total school enrollment; fourth-grade enrollment
Nonresponse adjusted	Census region; Black, non-Hispanic

For the original sample of schools in TIMSS-4 in the United States, six variables were found to be statistically significantly related to participation in the bivariate analysis: school control; community type; fourth-grade enrollment; the percentage of Black, non-Hispanic students; the percentage of Hispanic students; and the percentage of American Indian or Alaska Native students. Although each of these findings indicates some potential for nonresponse bias, when all of these factors were considered simultaneously in a regression analysis, private schools, South region, total school enrollment, fourth-grade enrollment, the percentage of Hispanic students, and the percentage of American Indian or Alaska Native students were significant predictors of participation. The second model showed that private schools, total school enrollment, and fourth-grade enrollment were significant predictors of participation (with summed race/ethnicity percentage).

For the final sample of schools in TIMSS-4, five of the six variables remained statistically significant in the bivariate analysis: school control; fourth-grade enrollment; the percentage of Black, non-Hispanic students; the percentage of Hispanic students; and the percentage of American Indian or Alaska Native students. When all of these factors were considered simultaneously in a regression analysis, private schools, total school enrollment and the percentage of American Indian or Alaska Native students remained significant predictors of participation. The second model showed that private schools, total school enrollment, and fourth-grade enrollment were significant predictors of participation (with summed race/ethnicity percentage).

For the final sample of schools in TIMSS-4 with school nonresponse adjustments applied to the weights, only two variables were statistically significant in the bivariate analysis: region and the percentage of Black, non-Hispanic students. The multivariate regression analysis cannot be conducted after the school nonresponse adjustments are applied to the weights.

These results suggest that there is some potential for nonresponse bias in the U.S. TIMSS-4 original sample based on the characteristics studied. It also suggests that, while there is no evidence that the use of substitute schools reduced the potential for bias, it has not added to it substantially. The application of school nonresponse adjustments substantially reduced the potential for bias.

Results for Original Respondent Sample—PIRLS Fourth Grade

This section presents the results of the nonresponse bias analysis, based exclusively on the original sample of 437 eligible U.S. schools for PIRLS-4. The distribution of the responding original school sample was compared with that of the total eligible original school sample using base weights in each case. All original schools in the sample that declined to participate in the survey were treated as nonparticipants regardless of whether they were substituted by a substitute school. The weighted and unweighted response rates were 80 percent, with 349 out of 437 eligible schools participating. See table 3-2 for details on the PIRLS-4 school participation rates.

Categorical variables (PIRLS-4). The distribution of participating and eligible schools in the U.S. PIRLS-4 sample by the four characteristics is shown in table 3-18. Based on these analyses, the chi-square statistics for school control and community type are significant and suggests that there is evidence of relationships with participating in the assessment. In particular, public schools were overrepresented among participating schools (94.6 vs. 91.3 percent, respectively), and private schools were underrepresented among participating schools (5.4 vs. 8.7 percent, respectively). Similarly, schools in cities were underrepresented among participating schools relative to eligible schools (27.2 vs. 30.2 percent, respectively), while schools in rural areas were overrepresented among participating schools (23.8 vs. 22.6 percent, respectively). There are no statistically significant relationships between participation status and any of the other characteristics shown in table 3-18.

Table 3-18. Percentage distribution of eligible and participating schools in the U.S. PIRLS fourth-grade original sample, by selected categorical variables: 2011

School characteristic	Sample schools		Bias	Relative bias	Chi-square <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 349)			
School control					0.000
Public	91.3	94.6	3.24	0.035	
Private	8.7	5.4	-3.24	-0.374	
Community type					0.027
City	30.2	27.2	-3.01	-0.100	
Suburban	35.5	36.7	1.15	0.032	
Town	11.7	12.3	0.64	0.055	
Rural	22.6	23.8	1.22	0.054	
Region					0.163
Northeast	16.4	15.0	-1.38	-0.084	
Midwest	21.2	20.4	-0.81	-0.038	
South	38.4	40.7	2.38	0.062	
West	24.0	23.9	-0.19	-0.008	
Poverty level					0.328
High	39.9	38.7	-1.20	-0.030	
Low	60.1	61.3	1.20	0.020	

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA) Progress in International Reading Literacy Study (PIRLS), 2011.

Continuous variables (PIRLS-4). Summary means for each continuous variable for participating and eligible schools are shown in tables 3-19 through 3-21. Twenty-four of the 399 public schools had a missing value for the free or reduced-price lunch variable; these schools were excluded from the analysis.

Participating schools had a higher mean fourth-grade enrollment than the eligible sample (99.1 vs. 94.0, respectively; table 3-19). There were no statistically significant differences detected between the participating and eligible public schools for race/ethnicity (table 3-20). Participating schools had a lower mean percentage than the eligible sample of students eligible for free or reduced-price lunch (46.6 vs.

48.1 percent, respectively; table 3-21). However, this must be interpreted with caution because this variable was missing for 24 public schools.

Table 3-19. Mean enrollment of eligible and participating schools in the U.S. PIRLS fourth-grade original sample: 2011

Student enrollment	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (mean) (N = 437)	Participating (mean) (N = 349)			
Total school	561.3	572.1	10.75	0.019	0.134
Fourth grade	94.0	99.1	5.07	0.054	0.000

NOTE: Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-20. Mean percentage of students in eligible and participating schools in the U.S. PIRLS fourth-grade original sample, by race/ethnicity: 2011

Race/ethnicity	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 349)			
White, non-Hispanic	55.9	56.3	0.39	0.007	0.646
Black, non-Hispanic	15.3	13.8	-1.51	-0.098	0.052
Hispanic	23.5	24.5	1.05	0.045	0.098
Asian or Pacific Islander	4.5	4.5	-0.03	-0.007	0.829
American Indian or Alaska Native	0.8	0.9	0.10	0.119	0.060

NOTE: Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-21. Mean percentage of students eligible for free or reduced-price lunch, in eligible and participating public schools in the U.S. PIRLS fourth-grade original sample: 2011

Students	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 375)	Participating (percent) (N = 308)			
Percentage of students eligible for free or reduced-price lunch	48.1	46.6	-1.50	-0.031!	0.050!

! Interpret data with caution.

NOTE: Information on percentage of students eligible for free or reduced-price lunch is missing for 24 of the 399 public schools in the original sample and 22 of the 330 public schools that participated. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample.

Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Logistic regression model (PIRLS-4). To examine the joint relationship of various characteristics to school nonresponse, the analysis utilized a logistic regression model with participation status as the binary dependent variable and frame characteristics as predictor variables. Public and private schools were modeled together using the variables available for all schools.

Standard errors and tests of hypotheses for the full model parameter estimates are presented in tables 3-22a (with four race/ethnicity variables) and 3-22b (with summed race/ethnicity percentage). Private schools, high poverty schools, total school enrollment, and fourth-grade enrollment are significant predictors of school participation in table 3-22a. The negative parameter estimates indicate that, relative to public and low-poverty schools, private and high poverty schools, respectively, were somewhat underrepresented among the participating schools, and the total enrollment in participating schools was smaller than in all eligible schools (i.e., the smaller the total enrollment, the more likely a school was to participate). The positive parameter estimates indicate that the fourth-grade enrollment in participating schools was larger than in all eligible schools. The *F* test statistic to determine whether the race/ethnicity characteristics are simultaneously equal to 0 was 3.69 with a *p* value of 0.0002, which indicates a significant relationship detected with participation.

Table 3-22a. Logistic regression model parameter estimates (with four race/ethnicity variables) using the U.S. PIRLS fourth-grade original sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	<i>t</i> test for H ₀ : parameter = 0	<i>p</i> value
Intercept	1.994	0.4809	4.1461	0.0001
City	-0.463	0.3497	-1.3243	0.1894
Suburban	-0.113	0.3526	-0.3204	0.7496
Town	-0.138	0.4843	-0.2849	0.7765
Private school	-1.311	0.5262	-2.4916	0.0149
High poverty	-0.889	0.3857	-2.3054	0.0239
Northeast	-0.127	0.4323	-0.2937	0.7698
Midwest	0.007	0.4309	0.0153	0.9878
South	0.662	0.3870	1.7108	0.0913
Total school enrollment	-0.002	0.0008	-2.0514	0.0437
Fourth-grade enrollment	0.014	0.0067	2.1045	0.0387
Black, non-Hispanic	-0.003	0.0066	-0.5334	0.5953
Hispanic	0.012	0.0067	1.7325	0.0873
Asian or Pacific Islander	-0.004	0.0149	-0.2460	0.8063
American Indian or Alaska Native	0.160	0.1117	1.4317	0.1564

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor. SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Private schools, high poverty schools, and fourth-grade enrollment again are significant predictors of school participation in table 3-22b. This model also shows that the summed race/ethnicity percentage is not significantly related to participation.

Table 3-22b. Logistic regression model parameter estimates (with summed race/ethnicity percentage) using the U.S. PIRLS fourth-grade original sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	<i>t</i> test for H ₀ : parameter = 0	<i>p</i> value
Intercept	2.181	0.4437	4.9158	0.0000
City	-0.544	0.3452	-1.5763	0.1192
Suburban	-0.145	0.3539	-0.4106	0.6825
Town	-0.041	0.4812	-0.0852	0.9323
Private school	-1.179	0.5243	-2.2481	0.0275
High poverty	-0.752	0.3677	-2.0450	0.0444
Northeast	-0.470	0.3968	-1.1856	0.2395
Midwest	-0.265	0.4015	-0.6603	0.5111
South	0.279	0.3346	0.8325	0.4077
Total school enrollment	-0.002	0.0008	-1.8862	0.0631
Fourth-grade enrollment	0.015	0.0069	2.2354	0.0284
Summed race/ethnicity percentage	0.003	0.0054	0.6334	0.5284

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing.) Summed race/ethnicity percentage includes Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Results for Respondent Sample With Substitutes (Final Sample)—PIRLS Fourth Grade

This section presents the nonresponse bias analysis based on the final sample of 437 eligible schools for PIRLS-4. The distribution of the responding sample, including participating substitutes, was compared to the total eligible final sample. School base weights were used for both the eligible sample and the participating schools. Only eligible original schools that refused and were not successfully replaced by a substitute were treated as nonparticipants. All other eligible original sample schools were treated as participating. Through the use of substitutes, the weighted and unweighted school response rates for PIRLS-4 were 85 percent, with 370 out of 437 schools participating.

Categorical variables (PIRLS-4). The distribution of participating and eligible schools by the four characteristics is shown in table 3-23. Only school control was found to be statistically significant among the categorical variables. In particular, public schools were overrepresented among participating schools

(94.9 vs. 91.3 percent, respectively), and private schools were underrepresented among participating schools (5.1 vs. 8.7 percent, respectively). These differences were slightly larger than that shown in table 3-18, in which only the original sample was considered. Thus while there is no evidence that the use of substitute schools eliminated the potential for bias, as indicated by this variable, it certainly has also not substantially added to it. There are no statistically significant relationships detected between participation status and the other characteristics shown in table 3-23.

Table 3-23. Percentage distribution of eligible and participating schools in the U.S. PIRLS fourth-grade final sample, by selected categorical variables: 2011

School characteristic	Sample schools		Bias	Relative bias	Chi-square <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 370)			
School control					0.000
Public	91.3	94.9	3.55	0.039	
Private	8.7	5.1	-3.55	-0.409	
Community type					0.239
City	30.2	28.4	-1.85	-0.061	
Suburban	35.5	36.5	0.96	0.027	
Town	11.7	11.9	0.21	0.018	
Rural	22.6	23.3	0.68	0.030	
Region					0.415
Northeast	16.4	15.2	-1.14	-0.070	
Midwest	21.2	20.9	-0.35	-0.016	
South	38.4	39.2	0.88	0.023	
West	24.0	24.7	0.61	0.025	
Poverty level					0.881
High	39.9	39.8	-0.15	-0.004	
Low	60.1	60.2	0.15	0.003	

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Continuous variables (PIRLS-4). Summary means for each continuous variable for participating and eligible schools are shown in tables 3-24 through 3-26. Twenty-four of the 399 public schools had a missing value for the free or reduced-price lunch variable; these schools were excluded from the analysis.

Participating schools had a higher mean fourth-grade enrollment than the eligible sample (99.1 vs. 94.0, respectively; table 3-24). Participating schools had a larger mean percentage than the eligible sample of Hispanic students (24.4 vs. 23.1 percent, respectively; table 3-25). The difference in the fourth-grade enrollment remained the same as shown in table 3-19, in which only the original sample was considered. The differences in the percentage of students who are Hispanic are somewhat larger than that shown in table 3-20, in which only the original sample was considered. Thus, as in the case with school control, while there is no evidence that the use of substitute schools substantially reduced the potential for bias, as indicated by these variables, it has also not substantially added to it.

There was no statistically significant difference detected between the participating and eligible public schools for free or reduced-price lunch (table 3-26). However, this must be interpreted with caution because the variable is missing for 24 schools.

Table 3-24. Mean enrollment of eligible and participating schools in the U.S. PIRLS fourth-grade final sample: 2011

	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (mean) (N = 437)	Participating (mean) (N = 370)			
Student enrollment					
Total school	562.2	575.2	13.00	0.023	0.057
Fourth grade	94.0	99.1	5.07	0.054	0.000

NOTE: Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-25. Mean percentage of students in eligible and participating schools in the U.S. PIRLS fourth-grade final sample, by race/ethnicity: 2011

Race/ethnicity	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 370)			
White, non-Hispanic	56.3	56.1	-0.22	0.00	0.7839
Black, non-Hispanic	15.2	13.9	-1.28	-0.08	0.0752
Hispanic	23.1	24.4	1.33	0.06	0.0176
Asian or Pacific Islander	4.7	4.8	0.09	0.02	0.4668
American Indian or Alaska Native	0.8	0.9	0.07	0.09	0.0575

NOTE: Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-26. Mean percentage of students eligible for free or reduced-price lunch, in eligible and participating public schools in the U.S. PIRLS fourth-grade final sample: 2011

Students	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 375)	Participating (percent) (N = 328)			
Percentage of students eligible for free or reduced-price lunch	47.9	46.7	-1.20	-0.025	0.059

NOTE: Information on percentage of students eligible for free or reduced-price lunch is missing for 24 of the 399 public schools in the final sample and 23 of the 351 public schools that participated. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Logistic regression model (PIRLS-4). To examine the joint relationship of various characteristics to school nonresponse, the analysis utilized a logistic regression model with participation status as the binary dependent variable and frame characteristics as predictor variables. Six schools were excluded from the analysis due to missing information for race/ethnicity and total school enrollment.

Private schools and fourth-grade enrollment remained significant predictors of school participation in table 3-27a. The negative parameter estimates indicate that, relative to public schools, private schools were somewhat underrepresented among the participating schools. The positive parameter estimates indicate that total enrollment in participating schools was larger than in all eligible schools, i.e., the larger the total enrollment, the more likely a school was to participate. The F test statistic to determine whether the race/ethnicity characteristics are simultaneously equal to 0 was 3.27 with a p value of 0.0006, which indicates a significant relationship detected with participation.

Private schools and fourth-grade enrollment remained significant predictor of school participation in table 3-27b. This model also shows that the summed race/ethnicity percentage is not significantly related to participation.

Table 3-27a. Logistic regression model parameter estimates (with four race/ethnicity variables) in the U.S. PIRLS fourth-grade final sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	t test for H_0 : parameter = 0	p value
Intercept	2.082	0.5995	3.4722	0.0009
City	-0.364	0.4363	-0.8337	0.4071
Suburban	-0.105	0.4455	-0.2366	0.8136
Town	-0.347	0.5378	-0.6457	0.5205
Private school	-1.366	0.5915	-2.3099	0.0236
High poverty	-0.772	0.4488	-1.7203	0.0895
Northeast	-0.327	0.5313	-0.6147	0.5406
Midwest	-0.027	0.5720	-0.0476	0.9621
South	0.237	0.4942	0.4796	0.6329
Total school enrollment	-0.002	0.0011	-1.8812	0.0638
Fourth-grade enrollment	0.023	0.0106	2.1802	0.0324
Black, non-Hispanic	-0.004	0.0073	-0.5402	0.5906
Hispanic	0.012	0.0088	1.4123	0.1620
Asian or Pacific Islander	-0.001	0.0164	-0.0742	0.9411
American Indian or Alaska Native	0.154	0.1156	1.3347	0.1860

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-27b. Logistic regression model parameter estimates (with summed race/ethnicity percentage) in the U.S. PIRLS fourth-grade final sample (N = 437): 2011

Parameter	Parameter estimate	Standard error	<i>t</i> test for H ₀ : parameter = 0	<i>p</i> value
Intercept	2.251	0.5648	3.9858	0.0002
City	-0.473	0.4378	-1.0802	0.2835
Suburban	-0.128	0.4531	-0.2832	0.7778
Town	-0.262	0.5367	-0.4881	0.6269
Private school	-1.194	0.5920	-2.0166	0.0473
High poverty	-0.650	0.4450	-1.4597	0.1486
Northeast	-0.674	0.4775	-1.4117	0.1622
Midwest	-0.317	0.5098	-0.6220	0.5358
South	-0.164	0.4054	-0.4051	0.6865
Total school enrollment	-0.002	0.0011	-1.8638	0.0663
Fourth-grade enrollment	0.026	0.0107	2.4145	0.0182
Summed race/ethnicity percentage	0.003	0.0062	0.5235	0.6022

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Summed race/ethnicity percentage includes Black, non-Hispanic; Hispanic; Asian or Pacific Islander; and American Indian or Alaska Native. Schools were weighted by their school base weights that did not include a nonresponse adjustment factor.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Results for Nonresponse-Adjusted Sample With Substitutes (Nonresponse-Adjusted Sample)—PIRLS Fourth Grade

This section presents the nonresponse bias analysis based on the final sample of 437 eligible schools for PIRLS-4. The distribution of the responding sample, including participating substitutes, was compared to the total eligible final sample just like the previous section. However, in this section, school base weights were used for the eligible sample of schools, whereas nonresponse-adjusted weights were used for the participating schools. Only eligible original schools that refused and were not successfully replaced by a substitute were treated as nonparticipants. All other eligible original sample schools were treated as participating.

Categorical variables (PIRLS-4). The distribution of participating and eligible schools by the four characteristics is shown in table 3-28. No variables were found to be statistically significant among the categorical variables.

Table 3-28. Percentage distribution of eligible and participating schools in the U.S. PIRLS fourth-grade nonresponse-adjusted sample, by selected categorical variables: 2011

School characteristic	Sample schools		Bias	Relative bias	Chi-square <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 370)			
School control					0.995
Public	91.3	91.3	0.00	0.000	
Private	8.7	8.7	0.00	0.000	
Community type					0.431
City	30.2	28.9	-1.33	-0.044	
Suburban	35.5	36.4	0.91	0.026	
Town	11.7	11.9	0.24	0.020	
Rural	22.6	22.8	0.19	0.008	
Region					0.110
Northeast	16.4	16.3	-0.03	-0.002	
Midwest	21.2	22.0	0.79	0.037	
South	38.4	38.1	-0.29	-0.008	
West	24.0	23.6	-0.47	-0.020	
Poverty level					0.872
High	39.9	39.9	-0.06	-0.002	
Low	60.1	60.1	0.06	0.001	

NOTE: For public schools, a high poverty school is defined as one in which 50 percent or more of the students are eligible for participation in the free or reduced-price lunch (FRPL) program, and low poverty is defined as having less than 50 percent eligible. All private schools are treated as low-poverty schools. For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Region is the Census region of the country (see section 3.5 for state listing). Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Continuous variables (PIRLS-4). Summary means for each continuous variable for participating and eligible schools are shown in tables 3-29 through 3-31. Twenty-four of the 399 public schools had a missing value for the free or reduced-price lunch variable; these schools were excluded from the analysis.

There were no statistically significant differences detected between participating and eligible schools for enrollment (table 3-29) or race/ethnicity (table 3-30). There was also no statistically significant difference detected between the participating and eligible public schools for free or reduced-price lunch (table 3-31). However, this must be interpreted with caution because the variable is missing for 24 schools.

Table 3-29. Mean enrollment of eligible and participating schools in the U.S. PIRLS fourth-grade nonresponse-adjusted sample: 2011

	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (mean) (N = 437)	Participating (mean) (N = 370)			
Student enrollment					
Total school	562.2	565.2	2.98	0.005	0.776
Fourth grade	94.0	96.2	2.19	0.023	0.096

NOTE: Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Education Achievement (IEA Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-30. Mean percentage of students in eligible and participating schools in the U.S. PIRLS fourth-grade nonresponse-adjusted sample, by race/ethnicity: 2011

	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 437)	Participating (percent) (N = 370)			
Race/ethnicity					
White, non-Hispanic	56.3	56.2	-0.04	0.00	0.968
Black, non-Hispanic	15.2	14.0	-1.20	-0.08	0.212
Hispanic	23.1	24.2	1.13	0.05	0.232
Asian or Pacific Islander	4.7	4.7	0.00	0.00	0.991
American Indian or Alaska Native	0.8	0.9	0.11	0.13	0.566

NOTE: Black includes African American, and Hispanic includes Latino. Racial categories exclude Hispanic origin. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table 3-31. Mean percentage of students eligible for free or reduced-price lunch, in eligible and participating public schools in the U.S. PIRLS fourth-grade nonresponse-adjusted sample: 2011

Students	Sample schools		Bias	Relative bias	<i>t</i> test <i>p</i> value
	Eligible (percent) (N = 375)	Participating (percent) (N = 328)			
Percentage of students eligible for free or reduced-price lunch	47.9	47.4	-0.50	-0.010	0.468

NOTE: Information on percentage of students eligible for free or reduced-price lunch is missing for 24 of the 399 public schools in the final sample and 23 of the 351 public schools that participated. Eligible schools contained at least one fourth-grade class. Participating schools agreed to have their students assessed. The bias is the difference between the respective estimates for the participants and the eligible sample. The relative bias is calculated as the bias divided by the estimate from the eligible sample. Schools were weighted by their school nonresponse adjusted weight.

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Summary—PIRLS Fourth Grade

The results of the grade 4 analyses are summarized in table 3-32.

Table 3-32. Characteristics with *p* values less than .05, U.S. PIRLS fourth-grade schools: 2011

Analysis	Characteristics with <i>p</i> values less than .05
Original sample	School control, community type, fourth-grade enrollment, students eligible for free or reduced-price lunch
Model a	Private school, high poverty, total school enrollment, fourth-grade enrollment
Model b	Private school, high poverty, fourth-grade enrollment
Final sample	School control, fourth-grade enrollment, Hispanic
Model a	Private school, fourth-grade enrollment
Model b	Private school, fourth-grade enrolment

For the original sample of schools in PIRLS-4 in the United States, four variables were found to be statistically significantly related to participation in the bivariate analysis: school control (table 3-18); community type (table 3-18); fourth grade enrollment (table 3-19); and the percentage of students eligible for free or reduced-price lunch (table 3-21). Although each of these findings indicates some potential for nonresponse bias, when all of these factors were considered simultaneously in a regression analysis, private schools, high-poverty schools, total school enrollment, and fourth-grade enrollment were significant predictors of participation (table 3-22a). The second model showed that private schools, total

high-poverty schools, and fourth grade enrollment were significant predictors of participation (table 3-22b, with summed race/ethnicity percentage).

For the final sample of schools in PIRLS-4, two of the four variables remained statistically significant in the bivariate analysis: school control (table 3-23) and fourth-grade enrollment (table 3-24). Additionally, the percentage of Hispanic students was statistically significantly related to participation (table 3-25). When all of these factors were considered simultaneously in a regression analysis, private schools and fourth-grade enrollment remained significant predictors of participation in both models (tables 3-27a and 3-27b, with summed race/ethnicity percentage).

For the final sample of schools in PIRLS-4 with school nonresponse adjustments applied to the weights, no variables were statistically significant in the bivariate analysis: The multivariate regression analysis cannot be conducted after the school nonresponse adjustments are applied to the weights.

These results suggest that there is some potential for nonresponse bias in the U.S. PIRLS-4 original sample based on the characteristics studied. It also suggests that, while there is no evidence that the use of substitute schools reduced the potential for bias, it has not added to it substantially. The application of school nonresponse adjustments completely reduced the potential for bias, based on the characteristics studied.

Conclusions

The investigation into nonresponse bias at the school level for U.S. 2011 TIMSS sample for grade 4 and the PIRLS sample for grade 4 has shown that there was no statistically significant relationship detected between participation status and the majority of school characteristics that are available for analysis. It also suggests that, while there is no evidence that the use of substitute schools reduced the potential for bias, it has not added to it substantially. The application of school nonresponse adjustments substantially reduced the potential for bias. However, the results do indicate some potential for bias in the data arising from school control, enrollment, and regional differences in participation, along with the fact that schools with higher percentages of minority students were less likely to participate. The results vary by sample and grade as summarized earlier. Since TIMSS and PIRLS are conducted under a set of standard rules designed to facilitate international comparisons, the U.S. nonresponse bias analysis results were not used to adjust the U.S. data for this source of bias.

3.5 Technical Notes

Description of Variables

Frame characteristics for public schools were taken from the 2007–08 Common Core of Data (CCD) and, for private schools, from the 2007–08 Private School Survey (PSS).

Race/ethnicity. Students' race/ethnicity was obtained through student responses to a two-part question. Students were asked first whether they were Hispanic or Latino and then asked whether they were members of the following racial groups: American Indian/Alaska Native; Asian; Black or African American; Native Hawaiian or other Pacific Islander; or White. Multiple responses to the race classification question were allowed.

Community type. Community type was derived from the locale variable based on how the school is situated in a particular location relative to populous areas, based on the school's address.

City consists of territory inside an urbanized area and inside a principal city with population of 250,000 or more, territory inside an urbanized area and inside a principal city with population less than 250,000 and greater than or equal to 100,000, and territory inside an urbanized area and inside a principal city with population less than 100,000.

Suburb consists of territory outside a principal city and inside an urbanized area with population of 250,000 or more, territory outside a principal city and inside an urbanized area with population less than 250,000 and greater than or equal to 100,000, and territory outside a principal city and inside an urbanized area with population less than 100,000.

Town consists of territory inside an urban cluster that is less than or equal to 10 miles from an urbanized area, territory inside an urban cluster that is more than 10 miles and less than or equal to 35 miles from an urbanized area, and territory inside an urban cluster that is more than 35 miles of an urbanized area.

Rural consists of Census-defined rural territory that is less than or equal to 5 miles from an urbanized area, as well as rural territory that is less than or equal to 2.5 miles from an urban cluster, Census-defined rural territory that is more than 5 miles but less than or equal to 25 miles from an urbanized area, as well as rural territory that is more than 2.5 miles but less than or equal to 10

miles from an urban cluster, and Census-defined rural territory that is more than 25 miles from an urbanized area and is also more than 10 miles from an urban cluster.

Region. Region is the Census region of the country. Northeast consists of Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. Midwest consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. South consists of Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia. West consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

Percentage of students eligible for free or reduced-price lunch. The proportion of students in a school eligible for the free or reduced-price lunch program, a federally assisted meal program under the National School Lunch Act that provides nutritionally balanced, low-cost or free lunches to eligible children each school day. The question on the CCD questionnaire asked what percentage of students at the school was eligible to receive free or reduced-price lunch through the FRPL around October 1, 2007. It is available only for public schools as the PSS data do not provide the same information for private schools.

Poverty level in public schools. The measure of school poverty is based on the percentage of students eligible for FRPL. Schools were classified as “low poverty” if less than 50 percent of the students were eligible for FRPL and as “high poverty” if 50 percent or more of the students were eligible. In the interest of retaining all of the schools and students in these analyses, private schools were assumed to be low-poverty schools—that is, they were assumed to be schools in which less than 50 percent of students were eligible for FRPL.

Statistical Procedures

Weighting. Before the data are analyzed, responses from the groups of students assessed are assigned sampling weights to ensure that their representation in TIMSS and PIRLS 2011 results matches their actual percentage of the school population in the grade assessed.

Responses from the groups of students were assigned sampling weights to adjust for over- or under-representation during the sampling of a particular group. The use of sampling weights is necessary for the computation of sound, nationally representative estimates. The weight assigned to a student’s responses is

the inverse of the probability that the student would be selected for the sample. When responses are weighted, none are discarded, and each contributes to the results for the total number of students represented by the individual student assessed. Weighting also adjusts for various situations (such as school and student nonresponse) because data cannot be assumed to be randomly missing. The internationally defined weighting specifications require that each assessed student's sampling weight should be the product of (1) the inverse of the school's probability of selection, (2) an adjustment for school-level nonresponse, (3) the inverse of the classroom's probability of selection, and (4) an adjustment for student-level nonresponse.

In the analyses in this report, sometimes the appropriate weight (base weight) includes only the components of the reciprocals of the respective selection probabilities. This is the case when estimates are made based on the entire sample. In other cases nonresponse adjustments, as computed by the International Study Center, are also applied. In each case the text and tables make clear which of these weighting procedures has been applied. Whereas for substantive analyses using the TIMSS and PIRLS data, one would normally apply the nonresponse adjustments when analyzing the data from the respondents in the sample, this is not always the case when carrying out analyses of potential nonresponse bias analyses.

Sampling errors. Sampling errors occur when the discrepancy between a population characteristic and the sample estimate arises because not all members of the reference population are sampled for the survey. The size of the sample relative to the population and the variability of the population characteristics both influence the magnitude of sampling error. The particular sample of students in fourth and eighth grade from the 2010–11 school year was just one of many possible samples that could have been selected. Therefore, estimates produced from the TIMSS and PIRLS sample may differ from estimates that would have been produced had another student sample been drawn. This type of variability is called sampling error because it arises from using a sample of students in fourth or eighth grade, rather than all students in the grade in that year.

The standard error is a measure of the variability due to sampling when estimating a statistic, and is often included in reports containing estimates from survey data. The approach used for calculating sampling variances was the jackknife repeated replication (JRR). This report does not show estimates of standard errors for each estimate. Rather the effects of sampling error are reflected in the test statistics (for *t* tests and chi-square tests, and *t* test used in logistic regression analyses) that are presented for each analysis. These are described below.

The first step to compute the variance with replication is to calculate the estimate of interest from the full sample as well as each subsample or replicate. The variation between the replicate estimates and the full-sample estimate is then used to estimate the variance for the full sample. Suppose that $\hat{\theta}$ is the full-sample estimate of some population parameter θ . The variance estimator, $v(\hat{\theta})$, takes the form

$$v(\hat{\theta}) = \sum_{g=1}^G (\hat{\theta}_{(g)} - \hat{\theta})^2$$

where

$\hat{\theta}_{(g)}$ is the estimate of θ based on the observations included in the g -th replicate, and
 G is the total number of replicates formed ($G = 75$ for U.S. TIMSS and PIRLS).

The standard error is then

$$se(\hat{\theta}) = \sqrt{v(\hat{\theta})}.$$

The JRR algorithm used in 2011 assumes that there are G replicates, each containing two sampled schools selected independently. The element $\hat{\theta}_{(g)}$ denotes the estimate using the g -th jackknife replicate. This is computed using all cases except those in the g -th replicate of the sample. For those in the g -th replicate, the replicate weights for all cases associated with one of the randomly selected units of the pair are multiplied by zero, and the replicate weights for the elements associated with the other unit in the replicate are doubled. The computation of the JRR variance for any estimate requires the computation of the statistic 76 times for any given country: once to obtain the estimate for the full sample, and 75 times to obtain the estimate for each of the jackknife replicates ($\hat{\theta}_{(g)}$).

Tests of Significance

Comparisons made in the text of this report have been tested for statistical significance. For example, when comparing results obtained from the full sample for a given grade, with those obtained only from the responding sample units, tests of statistical significance were used to establish whether or not the observed differences are statistically significant. The estimation of the standard errors that are required in order to undertake the tests of significance is complicated by the complex sample and assessment designs which both generate error variance. Together they mandate a set of statistically complex procedures in

order to estimate the correct standard errors. As a consequence, the estimated standard errors contain a sampling variance component estimated by jackknife repeated replication (JRR). Details on the procedures used can be found in the *WesVar 4.3 User's Guide* (Westat, 2007).

Two kinds of statistical tests are included in the report: t tests and chi-square tests. In addition, logistic regression analyses were conducted.

Use of t Tests

The t test was used for testing for the hypothesis that no difference exists between the means of continuous variables for two groups (namely, the full sample and the responding sample). Suppose that \bar{x}_A and \bar{x}_B are the means for two groups that are being compared and $se(\bar{x}_A - \bar{x}_B)$ is the standard error of the difference between the means, which accounts for the complex survey design. Then the t test is defined as

$$t = \frac{|\bar{x}_A - \bar{x}_B|}{se(\bar{x}_A - \bar{x}_B)}.$$

This statistic is then compared to the critical values of the appropriate student t -distribution to determine whether the difference is statistically significant. The appropriate number of degrees of freedom for the distribution is given by the number of primary sampling units in the design (in this case the number of schools), minus the number of sampling strata.

Note that this procedure took account of the fact that the two samples in question were not independent samples, but in fact the responding sample was a subsample of the full sample. This effect was accounted for in calculating the standard error of the difference. Note also that, in those cases where both samples were weighted just using base weights, the test is exactly equivalent to testing that the mean of the respondents was equal to the mean of the nonrespondents.

Consider for example the data in table 3-4. The first row shows that the weighted mean total school enrollment for the full eligible sample of grade 4 schools is 561.3. For the subsample of schools that participated, the corresponding mean is 570.1, resulting in a difference of 8.74. The standard error of this estimated difference, calculated so as to reflect the dependency between these two samples, and the complex sample design, is 6.65 (not shown in table). This gives rise to a t -statistic of 1.31 (not shown in

table), and using 75 degrees of freedom (the appropriate figure for the TIMSS and PIRLS design), the resulting significance (or p value) is 0.193. This last figure appears in the table.

The t test was also used in the logistic regression for testing for the hypothesis for whether each estimated parameter estimate is significantly different from 0. Then the t test is defined as

$$t = \frac{b_k}{\sqrt{v(b_k)}}$$

where b_k is a parameter estimate and $v(b_k)$ is the replication variance estimate for that parameter. This statistic is then compared to the critical values of the appropriate student t -distribution, as described above, to determine whether the difference is statistically significant. The appropriate number of degrees of freedom for the distribution is again given by the number of primary sampling units in the design (in this case the number of schools), minus the number of sampling strata.

Chi-square Tests

Chi-square tests are used for testing whether two distributions of a given categorical variable are different, conducted in a way that reflects the impact of the complex sample design on sampling variance. In this instance one distribution is for the full sample and one for the responding sample. Suppose that the categorical variable in question has c levels, cross-tabulated producing weighted proportions p . The usual Pearson chi-square statistic is calculated as

$$X^2 = n \sum_{i=1}^2 \sum_{j=1}^c (p_{ij} - p_{i \cdot} p_{\cdot j})^2 / p_{i \cdot} p_{\cdot j}$$

where j denotes the categories of the categorical variable, i indexes the samples (full sample and respondents), and n indicates the overall sample size. This statistic is not suitable for use directly in a statistical test with these data, for two reasons. First, the fact that the respondents are a subset of the full sample violates the standard assumptions for a chi-square test of this kind. Second, this statistic does not account for the complex sample design used to collect the data.

Thus the Pearson chi-square statistic is modified appropriately to account for the impact of these two features. The resulting test statistic is referred to as the Rao-Scott Adjusted chi-square statistic. It is sometimes also referred to as the Satterthwaite-adjusted chi-square statistic. The number of degrees of

freedom for the chi-square test, normally given as $(c - 1)$, where c is the number of categories of the categorical variable for each distribution, is also modified on account of the complex design. The modified test statistic is then compared to the chi-square distribution with the appropriate number of degrees of freedom, to determine whether the difference in the two distributions is statistically significant. For a detailed description of the technique, see Rao and Scott (1984) or Rao and Thomas (2003).

The first step in the calculation of the Satterthwaite-adjusted chi-square statistic is to form the following vector:

$$Y = \sqrt{n} \begin{pmatrix} p_{11} - p_{1\cdot}p_{\cdot 1} \\ p_{12} - p_{1\cdot}p_{\cdot 2} \\ \vdots \\ p_{rc} - p_{r\cdot}p_{\cdot c} \end{pmatrix} = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_{rc} \end{pmatrix}.$$

An $rc \times 1$ vector made up of the products of the marginal proportions is defined as

$$p = \begin{pmatrix} p_{1\cdot}p_{\cdot 1} \\ p_{1\cdot}p_{\cdot 2} \\ \vdots \\ p_{r\cdot}p_{\cdot c} \end{pmatrix} = \begin{pmatrix} p_1 \\ p_2 \\ \vdots \\ p_{rc} \end{pmatrix}.$$

For each replicate, an $rc \times rc$ matrix is calculated whose ij -th element is made up of

$$(y_{ig} - y_i)(y_{jg} - y_j),$$

where y_{ig} and y_{jg} are the i -th and j -th elements of Y calculated for the g -th replicate and y_i and y_j are the corresponding full-sample values. The ij -th element of the estimated covariance matrix for Y , $B = \text{cov}(Y)$, is calculated using the following formula:

$$B_{ij} = \sum_{g=1}^G (y_{ig} - y_i)(y_{jg} - y_j),$$

where c is the constant appropriate to the replication method ($c = 0.05$ for U.S. TIMSS and PIRLS). The Satterthwaite's approximation to degrees of freedom for the chi-square statistic to be calculated is

$$\nu = \frac{\left(\sum_{i=1}^{rc} \frac{B_{ii}}{p_i} \right)^2}{\sum_{i=1}^{rc} \sum_{j=1}^{rc} \frac{B_{ij}^2}{p_i p_j}}.$$

Since ν will generally not be an integer, interpolation in standard chi-square tables is required.

Finally, the adjusted chi-square statistic is defined as

$$RS3 = \frac{X^2}{\sum_{i=1}^{rc} \frac{B_{ii}}{p_i}}.$$

Logistic Regression Models

Let p_i denote the probability that the i -th sampled school will participate. Under the logistic regression model, the log odds of response propensity (expressed in terms of the logarithm of $p_i/(1-p_i)$), is assumed to have the following linear form:

$$\log \left(\frac{p_i}{1-p_i} \right) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_p X_{pi}$$

where $X_{1i}, X_{2i}, \dots, X_{pi}$ are p auxiliary variables associated with the i -th sampled school, and $\beta_0, \beta_1, \dots, \beta_p$ are coefficients to be estimated. Asymptotic assumptions are used to develop statistical tests to determine which, if any, of the coefficients are significantly different from zero. In the analyses in this report the standard procedures for carrying out logistic regression analyses have been modified both to incorporate the sampling weights in the estimation of the coefficients and to reflect the effect of the complex sample design on the variance-covariance matrix of the coefficients.

The Newton-Raphson algorithm is used to iteratively solve for parameter solutions in the logistic regression. Let $q(\beta) = \partial L_n(\beta) / \partial \beta$ be the vector of first partial derivatives of the sample log-likelihood

with respect to β . Let $H(\beta)$ be the matrix of second partial derivatives (or Hessian) of the sample log-likelihood having entries $\partial^2 L / \partial \beta_a \partial \beta_b$, where β_a and β_b are two separate components of β . Denote by q^t and H^t the values of $q(\beta)$ and $H(\beta)$ evaluated at b^t , the value of the estimate b at step t .

The general approach is to approximate the sample log-likelihood at the desired estimate, $L_n(b)$, at step t in the iterative process near the point b^t by a second-order Taylor series expansion:

$$L_n^t(b) \cong L_n(b^t) + q^{t'}(b - b^t) + \frac{1}{2}(b - b^t)' H^t(b - b^t)$$

Solving $\partial L^t / \partial b = q^t + H^t(b - b^t) = 0$ for b yields the iteration equations

$$b^{t+1} = b^t - [H^t]^{-1} q^t,$$

assuming H^t has an inverse. Given an initial value for $t = 0$, the set of iteration equations is solved for b^1 , b^1 is used to solve for b^2 , and so on, until the convergence criterion is satisfied. The $se(\hat{\beta})$ is calculated using JRR and repeating the procedure for each replicate.

4. Survey Operations

This chapter describes data collection and related activities for TIMSS and PIRLS 2011 in the United States. These activities included recruitment of schools for the national and state samples; sampling of students within schools; development of the instruments used; field operations undertaken to administer the assessment; post assessment activities associated with scoring and data entry; and several activities associated with the preparation of the data to meet international standards.

4.1 Recruiting Districts and Schools

The established protocol for seeking the participation of schools in studies such as TIMSS and PIRLS, where participation is voluntary, is to (1) notify state education authorities of the intention to approach schools within their jurisdiction, (2) inform authorities at the district level that schools within their districts are being sampled, and (3) contact the sampled schools. Participation may be refused at any of these levels, so several considerations were important in this context, specifically the need to establish the value of participation; establish the timing of the assessment window in conjunction with mandatory federal, state, and local assessments; and address concerns about the burden on schools. Private schools were contacted directly. In the case of Catholic schools, the diocese was informed and schools were then contacted. Non-religious affiliated private schools were contacted directly.

The recruitment for TIMSS and PIRLS, particularly at grade 8, benefitted from increased involvement at the state level. The inclusion of a TIMSS-NAEP linking study at grade 8 allowed NAEP State Coordinators within each state to secure participation of sampled public schools in their states.

Timing of Recruitment Activities

Assessment dates needed to be established early in the school year in which the assessment was to take place or, better still, toward the end of the previous school year. In total, the recruitment phase for TIMSS and PIRLS 2011 extended from April 2010 through May 2011, as indicated in exhibit 1-1 in chapter 1. States were contacted toward the end of April 2010. Following this, contact with districts began in May 2010 and continued through the summer. Schools were contacted beginning in June 2010 and activities continued through March 2011.

The Impact of the Sampling Design on Recruitment Activities

The sampling design played an important role in the design of recruitment activities. TIMSS and PIRLS were administered jointly in the same schools at grade 4, therefore the school sample was slightly larger in order to obtain enough students. As a result, 450 schools were sampled in the first instance, along with 450 first substitutes and 450 second substitutes, for a total of 1,350 schools. The school sample design at grade 8 was 600 schools, each with two replacements. The total sample was 1,800 schools, including substitutes. In gaining the cooperation of schools, at each grade level the sampled schools were approached in the first instance. Operationally this meant first informing the districts in which these schools are located and then approaching the schools themselves. If a sampled school refused to participate, the district of the first substitute school was approached and the district-school permission procedure began anew. If the first substitute school refused as well, then the district of the second substitute school was approached and then the second substitute school. The sampling design came into play with the distribution of schools across districts and the consequences that this had for the volume and length of the permission process.

With state representatives actively gaining cooperation from the eighth-grade schools (and in some cases the fourth-grade schools) in the original national sample, as well as the benchmarking states, the process was simplified. In fact, only 22 substitute schools were used at grade 4 and only two substitutes were used at grade 8. Thus in both grades, there was an increased original school response rate from previous rounds of TIMSS and PIRLS.

Contacting States

The chief state school officer and state assessment director in each of the 50 states and the District of Columbia were contacted beginning in April 2010. Each person received a combined TIMSS-PIRLS package that included an NCES cover letter, instructions on how to obtain the sampled schools in the state, a brochure describing the study, a timeline of activities, a summary of activities for the school coordinator, and a sheet of frequently asked questions. A copy of the letter sent to states is provided as exhibit C-1 in appendix C. Several items of TIMSS and PIRLS information materials (exhibits D-1 through D-8 in appendix C) were included with the letter.

Similar packages were supplied to NAEP State Coordinators (NSCs), and NCES and Westat held a series of webinars to explain TIMSS at grade 8 and the processes used to report participation and to answer questions about the study. In many cases, NSCs created personalized contact letters for districts and

schools. Westat tracked cooperation status weekly through a secure automated reporting system used by NSCs similar to that used by the Westat recruitment staff working on TIMSS and PIRLS at grade 4.

Contacting Districts

After informing the states, similar packages of advance materials were sent to the superintendent and the assessment director of each district (or diocese) containing sampled schools. A copy of the letter sent to districts is provided as exhibit C-2 in appendix C. Several items of TIMSS and PIRLS information materials (exhibits D-1 through D-8 in appendix D) and a list of sampled schools were included with the letter.

During this time, if a sampled school in a cooperating district refused to participate and was judged to be a firm refusal, a similar district package was sent out to the district of the first substitute school linked to the sampled school. A parallel procedure was adopted with the second substitute district and school in those cases where a first substitute school refused to participate.

Follow-up Contact

In each case field staff made follow-up calls to district contacts after a few days to discuss the study and answer questions. Additionally, 57 school districts required a formal application process and school board approval. However, given that many of these were in states with eighth-grade sampled schools, thus states were contacting the districts and schools, these requirements were waived. Only 16 applications had to be formally processed.

Special security requirements. As a matter of course, each TIMSS field staff member had a current FBI clearance and fingerprints on file. In most instances this satisfied school security requirements. However, a number of districts required that additional procedures be met before allowing staff to enter schools. For example, New York City required staff to obtain additional, local fingerprinting at a local office in New York City. Additionally, for each school in New York City, Westat was also required to complete a special form with signatures from both the principal and the district superintendent. In Florida, several districts required additional fingerprinting and a local security check (Miami-Dade County required the completion of an Affidavit of Good Moral Character). In many cases, field staff working in these districts had these clearances on file from their recent NAEP work.

Contacting Schools

After district approval was secured, schools were contacted with an initial school information packet. Private schools and some parochial schools not linked with a diocese were contacted directly. Each school information package was sent on a flow basis governed by receipt of district approval. A copy of the cover letter included in the school package is shown as exhibit C-3 in appendix C. Copies of items of TIMSS and PIRLS information materials (exhibits D-1 through D-8 in appendix D) were included with the letter.

Follow-up Contact

After a few days, each school was contacted by a field staff member to discuss the school's participation in TIMSS. In-person visits were made in a small number of schools where efforts to secure participation proved difficult.

Nomination of school coordinator. School principals were asked to identify an individual within the school who would act as the TIMSS school coordinator. Principals, deputy principals, teachers, and guidance counselors took on this role. School coordinator responsibilities included the following:

- Working with Westat to finalize an assessment date;
- Preparing a list of all mathematics classrooms in the specified grade;
- Identifying excluded classrooms;
- Identifying students and teachers in the sampled classrooms;
- Identifying excluded students in the sampled classrooms;
- Liaising with staff, students, and parents as necessary;
- Arranging for space and for the release of students from classes on assessment day;
- Ensuring completion and return of the school and teacher questionnaires; and
- Holding secure, until 2012 the confidential files that linked student names with IDs and then destroying them.

Informational Materials and Gifts

Since the initial contact with states, districts, and schools was by mail, particular attention was paid to developing materials that would promote the value of participation and assure all concerned that the burden on schools would be minimal. These materials included the following:

- TIMSS and PIRLS brochures, a tri-fold describing TIMSS or PIRLS, its history, and its importance for the United States (exhibit D-4 and D-8 in appendix D);
- TIMSS and PIRLS grade 4 and TIMSS grade 8 Frequently Asked Questions sheets, showing a selection of publications arising out of TIMSS and PIRLS (exhibit D.3 and D.7 in appendix D);
- Timelines of activities listing broad timeframes and activities occurring within them for TIMSS and PIRLS grade 4 and TIMSS grade 8 (exhibit D-1 and D-5 in appendix D); and
- A summary of activities for school coordinators brochure designed to indicate the specifics of school participation in TIMSS and PIRLS (exhibit D-2 and D-6 in appendix D).

After the assessment, schools and school coordinators were paid incentives of \$200 and \$100, respectively. Students each received a clock-compass carabiner.

Some additional documents were used to maintain contact with schools throughout the year and to inform school coordinators of coming TIMSS and PIRLS activities; see, for example, the sheet describing school coordinator responsibilities (exhibit D-2 in appendix D). Schools were sent a holiday card toward the end of 2010, and at various points school coordinators were sent informational materials to prepare them for upcoming TIMSS and PIRLS tasks. Drafts of parent approval letters, forms, and fact sheets were supplied to those schools indicating that parent approval was required. Details on the parent approval materials is provided in exhibits C-6 through C-14 in appendix C and discussed further below.

Gaining Cooperation Recruiters (GCRs)

Nine gaining cooperation recruiters (GCRs) experienced with recruiting districts and schools on previous rounds of similar studies (NAEP, PISA, TIMSS, and PIRLS), along with a field manager, were assigned to recruit schools at grade 4 as well as private schools at grade 8. On average, each GCR had responsibility for about 50 schools.

Field manager responsibilities. The field manager engaged in the recruiting phase of the study had the following responsibilities:

- coordinating recruitment activities of the GCRs within their assignment;
- holding weekly one-on-one telephone meetings with their GCRs to monitor progress on gaining-cooperation activities and to troubleshoot recruitment strategies;
- monitoring and maintaining the Field Management System, ensuring that the disposition codes provided by GCRs gave an accurate portrayal of participation status; and
- acting as troubleshooters to handle special issues that arose during the recruiting process.

GCR responsibilities. The primary responsibility of the nine GCRs was person-to-person interaction with the districts and schools along with some more administrative tasks, as follows:

- making telephone contact to sampled schools, and in some cases, their districts or diocese, within their assignment to obtain permission to conduct TIMSS and PIRLS;
- making in-person refusal conversion attempts when necessary and requested by a field manager;
- completing an electronic record of calls (EROOC) of each contact within the Field Management System (FMS);
- maintaining the most current disposition codes within the FMS; and
- meeting weekly with the field manager by conference call to discuss progress.

Training Field Staff

A recruitment training workshop for field staff was held at Westat on June 6, 2010. A Gaining Cooperation Manual was assembled and sent to GCRs 5 days prior to training. GCRs were asked to complete 4 hours of home study before training.

The training was delivered as distance training through a webinar with the field manager and project director. All of the materials that would be sent to district and school contacts in the recruitment package were provided and explained. A subsequent discussion ensured that all field staff engaged in the recruitment of districts and schools understood the mission of TIMSS and PIRLS, the materials used in the United States, and the importance of satisfactory participation rates.

The presentation illustrated the responsibilities of a TIMSS and PIRLS recruitment supervisor. Preliminary activities, such as planning, organizing, coordinating, and scheduling, were presented as well as an examination of the expected administrative tasks. At the conclusion of day 1, field staff were asked to familiarize themselves with the *TIMSS and PIRLS Frequently Asked Questions* and to develop a “TIMSS and PIRLS story” of talking points suitable for recruiting tasks.

Gaining cooperation exercises were performed by the GCRs. Training included open discussions about interpersonal skills important for gaining the cooperation of districts and schools. These included introducing the assessment; answering questions; dealing with schools’ concerns; overcoming objections; and avoiding refusals. Participants were invited to share successful strategies and techniques in past recruitment experiences. Also, approaches that might be used with schools for refusal conversion were introduced and practiced. To reinforce these presentations and discussions, several role-playing exercises were performed after the training session.

The final activity was the completion of a hands-on tutorial of the TIMSS and PIRLS Field Management System (FMS). Each GCR had a laptop workstation connected to the FMS and a set of small exercises to complete on dummy case data in the system.

Monitoring the Recruiting Progress

Progress in recruiting districts and schools was monitored on a daily basis through the TIMSS and PIRLS Field Management System (FMS). GCRs were required to update the FMS for each contact made with districts or schools using an electronic record of calls that included updating the disposition code for the district/school in question. The disposition code indicated whether the district or school was pending, refusing, or cooperating. Using these status codes, the Westat home office tracked the progress of recruitment and generated daily reports. These daily reports enabled the operations of recruitment (and eventually assessments) to be closely monitored.

NAEP State Coordinators used a special template similar to the FMS to monitor the recruitment status of eighth-grade public schools in their states.

Difficulties in Gaining Cooperation

The principal reasons given by both districts and schools for refusing to participate included, in approximate order of priority, the following:

- Conflict with mandatory federal, state, and/or local assessments whose outcomes had direct implications for districts, schools, teachers and students;
- The related matter of the burden that additional testing placed on students at the cost of instructional time; and
- The limited return on the school's investment of time since they would not receive much usable information on the school, and none on particular students.

4.2 Sampling Students Within Schools

Students in participating schools were sampled in a two-stage process. In the first stage, schools were asked to provide lists of fourth-grade classrooms or eighth-grade mathematics classrooms that indicated the number of students in each class. An equal probability sample of two classrooms (or pseudoclassrooms) was identified from the classrooms listed for each school. In the second stage all students in sampled classrooms (or pseudoclassrooms) were selected for assessment.

These procedures are standardized internationally and embodied in software made available to each country. The software was developed by the IEA Data Processing Center (DPC) and is known as WinW3S (IEA DPC, 2010). The WinW3S system provides for forms generation, data entry, class sampling, student sampling, student-teacher linkages, the random assignment of assessment booklets to students, the production of various survey tracking forms, and the printing of labels for test instruments and questionnaires.

Westat home office staff attended a training session using WinW3S and conducted a 2-day training for the data entry staff to introduce them to the software and familiarize them with the listing forms and the procedures for entering data.

Obtaining Class Lists From Schools

A Class Listing Form (CLF) was sent to the school coordinator. The CLF was used to create a list of the eligible classes, some attributes of each class, and the names of the teacher(s) teaching each class. An example Class Listing Form for grade 4 is reproduced in exhibit 4-1. A similar form for grade 8 is shown in exhibit 4-2.

The information relating to school ID and school name, the name of the school coordinator, and the grade level in question was filled before the form was dispatched. Schools were asked to complete the remaining information for each eligible fourth-grade class or eighth-grade mathematics class in the school. At grade 4, the form asked for the reading, math, and science teachers to be listed in addition to the class information. In grade 8, only the mathematics teachers were listed for each class.

The CLFs were sent via FedEx in a packet to each designated school coordinator and contained a customized cover letter, the school's CLF, and a school coordinator handbook for TIMSS-PIRLS or TIMSS (based on the grade).

This packet was followed by an email with an encrypted CLF attachment that was password protected. Emails were sent to schools for which email addresses were available. All schools received a hard copy. The first wave of emails was sent January 27, 2011 (grade 4 CLFs); the second wave was sent February 1, 2011 (grade 8 CLFs).

Processing the Class Listing Forms. Receipt of the CLF was tracked using a ledger that included the return status of each form and detailed any anomalies. The status of schools was reviewed weekly. As CLFs were returned, they were processed as follows:

- The forms were reviewed for clarity and completeness.
- Any incomplete forms generated calls to the schools in question to provide the information or clarification necessary.
- Completed forms were passed to data entry staff where the information was entered into WinW3S, and a CLF in WinW3S system format was generated.
- The WinW3S CLF was compared with the original form as a check on the accuracy of data entry.

Exhibit 4-1. Example of TIMSS and PIRLS fourth-grade class listing form with mock data

T & P 11 - Class Listing Form							
T&P Participant Country				USA			
School Name				St. Peter Catholic School			
School ID				3012			
School Coordinator Name				Sister Mary Francis			
Phone Number				878-524-2354			

1	2	3	4	5	6	7	8
Class Name	Grade	Stream	Number of Students	Class Exclusion Status	Name of Class Teacher or Reading / Language Teacher	Name of Mathematics Teacher	Name of Science Teacher
4I	4	0	15		Sherita Bitten	Adrian Alexander	Adrian Alexander
4I	4	0	10		Amanda Druckett	Cynthia Monroe	Cynthia Monroe
4R	4	0	12		Lisa Kidwell	Kristi Brooks	Kristi Brooks
4R	4	0	12		Janise Burton	Jennifer Ward	Jennifer Ward

Grade (column 2) :

Enter the grade for students in the class. Or, if the class is a mixed grade class, enter "M."

Stream (column 3):

Class streams occur when students are assigned to classes based on their ability. If the class is grouped by ability, please indicate so with the following codes: 0=not grouped; 1=low ability; 2=average ability; 3= high ability.

Class Exclusion Status (column 5):

As a rule, all classes are to be included. Examples of class-level exclusions include classes where all students belong to at least one of the following three exclusion status categories: 1 = students with functional disabilities; 2 = students with intellectual disabilities; 3 = non-native language speakers. If all students in the excluded class do not belong to the same exclusion category, please identify the category corresponding to the majority of students. All class-level exclusions must be approved.

Name of Reading/Language Teacher (column 6):

Name of the teacher teaching reading/language arts content to the class.

Name of Mathematics Teacher (column 7):

Name of the teacher teaching mathematics content to the class.

Name of Science Teacher (column 8):

Name of the teacher teaching science content to the class.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011; Progress in International Reading Literacy Study (PIRLS), 2011.

Exhibit 4-2. Example of TIMSS eighth-grade class listing form with mock data

T 11 - Class Listing Form - Grade 8					
TIMSS Participant Country					USA
School Name					First Middle School
School ID					3002
School Coordinator Name					Brenda Groomes
Phone Number					587-727-1258

1	2	3	4	5	6
Class Name	Grade	Stream	Number of Students	Class Exclusion Status	Name of Mathematics Teacher
Algebra 8A	8	3	26		Samantha Lewin
Algebra 8B	8	3	26		Samantha Lewin
Pre-Algebra 8A	8	2	32		Mark Haygood
Pre-Algebra 8B	8	2	33		David Wellington
Geometry	M	3	10		David Wellington
General Math 1	8	0	33		Mark Haygood
General Math 2	8	0	32		Samantha Lewin
General Math 3	8	0	32		Mark Haygood

Grade (column 2) :

Enter the grade for students in the class. Or, if the class is a mixed grade class, enter "M."

Stream (column 3):

Class streams occur when students are assigned to classes based on their ability. If the class is grouped by ability, please indicate so with the following codes: 0=not grouped; 1=low ability; 2=average ability; 3= high ability.

Class Exclusion Status (column 5):

As a rule, all classes are to be included. Examples of class-level exclusions include classes where all students belong to at least one of the following three exclusion status categories: 1 = students with functional disabilities; 2 = students with intellectual disabilities; 3 = non-native language speakers. If all students in the excluded class do not belong to the same exclusion category, please identify the category corresponding to the majority of students. All class-level exclusions must be approved by the national center.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Sampling Classes. WinW3S generated an equal probability sample of two classes (or pseudoclasses) where possible, based on the information in the CLF. If only one grade-appropriate class was available in a school, this class was selected with certainty. At grade 4, up to four classes were sampled and assigned to either TIMSS or PIRLS. The WinW3S sampling software handled the assignment of classes by randomly assigning the first sampled class and alternating assignment of each subsequent sampled class.

In grade 8 schools, two classes were sampled unless the school only had one grade 8 class. The TIMSS-NAEP linking study at grade 8 required that one of the sampled classes be designated as the TIMSS-NAEP link class in order to administer a braided booklet of TIMSS and NAEP items. Once the classes were selected, a random number table (0-9) was used to define the TIMSS-NAEP link class. If the number was greater than or equal to 5, the class was designated as the link class. If the number was less than 5, the class was designated as the TIMSS class. The second class was assigned based on the designation of the first class. Once the link class was chosen, “LK” was added to the end of the class name to signify that the class was the link class.

Identifying Students and Their Teachers

With the classes identified, a Student-Teacher Linkage Form (STLF) was generated for each of the sampled classes in TIMSS and a Student Listing Form (SLF) was created for sampled classes in PIRLS. These forms were created by the WinW3S software and output in Excel using information from the CLF. An example of an STLF and SLF containing fictitious information is provided in exhibits 4-3 and 4-4, for TIMSS and PIRLS respectively.

The upper part of the form containing the school ID, school name, class ID, school coordinator name, and grade was completed using information from the Class Listing Form. The remainder of the form was to be completed by the school, beginning with a listing of the names of the students in the named class. Schools were then asked to work across the form line-by-line to add the information relating to each student and to the mathematics and science teacher(s) of each student.

Copies of the forms describing each of the sampled classes, along with instructions and examples, were sent to each school coordinator.

Exhibit 4-3. Example of TIMSS eighth-grade student-teacher linkage form with mock data

**T 11 -
Student-Teacher Linkage Form - Grade 8**

School Name:

ONE MIDDLE SCHOOL

Participant Country:

United States

[a]

ID
3001

[b]

Class ID
300102

[c]

Class Name
Pre-Algebra P.3

[d]

Grade
8

1	2	3	4	5	6
Student Name or Number	Date of Birth			Teacher Information	No Mathematics Teacher No Science Teacher
	MM	DD	YYYY		
Abrahams, Jeff	1	25	1997	Patricia Renz Pre-Algebra P. 3 1 Manny Foy General Science P.1 6 Stormy Young General Science P. 5 6 Stormy Young General Science P. 6 6 Cheri Young General Science P. 2 6 Cheri Young General Science P. 6 6	
Adams, Joyce	3	14	1997		
Bailey, Kelli	9	6	1997		
Baxter, Lucas	11	7	1997		
Cuffman, Gage	8	2	1997		
Davies, Wallace	6	23	1996		
Denton, Patricia	11	15	1996		
Forth, Trent	10	11	1997		
Grant, Jackson	12	20	1996		
High, Teresa	7	6	1997		
Jefferson, Rudy	4	1	1997		
Jewels, Ashley	2	9	1997		
Kuben, Shannon	1	30	1997		
Lorins, Scott	6	16	1997		
Luther, Mary	9	19	1997		
Maxwell, Stacey	10	10	1996		
Pace, Hilda	12	21	1995		
Page, John	8	31	1997		
Russell, A.J.	9	8	1997		
Rutx, Patrick	5	7	1997		
Sanchez, Paul	7	2	1997		
Simonton, Sia	8	3	1997		
Willmon, Lindsay	4	16	1997		

Gender (column 3): 1 = Female; 2 = Male

Exclusion Status (column 4): 1 = Students with functional disabilities;
 2 = Students with intellectual disabilities; 3 = Non-native language speakers

Subject Codes (Column 5): 1 = Mathematics; 6 = Integrated Science

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exhibit 4-4. Example of PIRLS student listing form with mock data

P 11 - Student Listing Form					
P Participant Country		USA			
School Name		St. Peter Catholic School			
School ID		3012			
Class Name		4R-A			
Teacher Name		Lisa Kidwell			

1 Student Name	2 Date of Birth			3 Gender	4 Exclusion Status
	MM	DD	YYYY		
Trey Judge	02	14	2000	2	
Mark Beaufort	03	30	2000	2	
Cristin Viceory	04	01	2000	1	
Callie Frederick	05	15	2000	1	
Wendy Hill	07	09	2000	1	
Frederick Beau	08	02	2000	2	
Halford Gregory	09	16	2000	2	
Marcus Hughes	10	02	2000	2	
Valerie Sanders	11	22	1999	1	
Elizabeth Lewis	11	28	1999	1	
Suzanne Sutton	12	05	1999	1	
Shelly Vandemeyer	12	30	1999	2	

Gender (column 3):

1 = Female; 2 = Male

Exclusion Status (column 4):

1 = Students with functional disabilities; 2 = Students with intellectual disabilities; 3 = Non-native language speakers

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

The response by schools to completing this somewhat formidable task was encouraging, although it required more follow-up than with the simpler Class Listing Form. The return of the STLTF forms was tracked and reviewed weekly with the view to initiating reminder calls from field staff to the schools.

Student Tracking Forms (STF)

Information from the STLTF was entered into the WinW3S system, which generated a Student Tracking Form (STF) for each class. The Student Tracking Form was designed to provide test administrators with student IDs, student identifiers in the form of date of birth and sex, the booklet assignment to each student, and the means to record the completion of the assessment and associated questionnaire. The student names or IDs shown in the first column of the form were removed following the assessment and retained by the school to ensure confidentiality. An example of a STF containing fictitious information is provided in exhibit 4-5.

Teacher Tracking Form (TTF)

A Teacher Tracking Form was also generated from information provided on the STLTF. This form enabled test administrators to record the participation of teachers and to ensure that each teacher received the correct teacher questionnaire. Teacher names provided in the TTF were removed following the assessment and retained by the school to ensure confidentiality. An example of a TTF containing fictitious information is provided in exhibit 4-6.

Exhibit 4-5. Example of TIMSS eighth-grade student tracking form with mock data

T 11 - Student Tracking Form - Grade 8											
School Name:		TIMSS Participant Country:									
First Middle School		United States									
		[a]	[b]	[c]	[d]	[e]					
		School ID	Class ID	Class Name	Grade	Language of Test					
		0453	045307	General Math 2	8	English					
1	2	3			4	5	6	7			
Student Name or Number	Student ID	Date of Birth			Gender	Exclusion Status	TIMSS Booklet	Participation Status			
								Main Session		Make-Up Session	
		MM	DD	YYYY				Achievement Session	Questionnaire Session	Achievement Session	Questionnaire Session
Boyette, Dori	04530701	02	13	1997	1		1				
Brenton, Paige	04530702	03	07	1997	1		2				
Calzada, Kimberley	04530703	05	01	1997	1		3				
Cassano, Darrick	04530704	08	24	1997	2		4				
Cassano, Hector	04530705	09	08	1997	2		5				
Cayer, Gordon	04530706	07	11	1997	2		6				
Danko, Shane	04530707	05	09	1997	2		7				
Doner, Christa	04530708	06	14	1997	1		8				
Ellwood, Ingrid	04530709	11	19	1996	1		9				
Esteban, Glenna	04530710	08	17	1997	1		10				
Fabrizio, Alta	04530711	10	26	1996	1		11				
Fleagle, Elvia	04530712	01	31	1997	1		12				
Goodenough, Jolene	04530713	02	14	1997	1		13				
He, Vernon	04530714	04	07	1997	2		14				
Holquin, Greg	04530715	07	22	1997	2		1				
Klick, Stefanie	04530716	12	16	1996	1		2				
Lever, Sam	04530717	11	07	1996	2		3				
Machin, Dustin	04530718	01	06	1997	2		4				
Magwood, Elisabeth	04530719	09	09	1997	1		5				
Olmedo, Corey	04530720	04	23	1997	2		6				
Piggford, Betsie	04530721	05	19	1997	1		7				
Santangelo, Clyde	04530722	02	21	1997	2		8				
Segovia, Derrick	04530723	08	02	1997	2		9				
Singley, Lewis	04530724	11	27	1996	2		10				
Spry, Rick	04530725	12	28	1996	2		11				
Studivant, Imogene	04530726	08	25	1997	1		12				
Tarnowski, Dean	04530727	06	01	1997	2		13				
Thorpe, Glenda	04530728	03	24	1997	1		14				
Trump, Clyde	04530729	01	11	1997	2		1				
Ugalde, Rachelle	04530730	05	23	1997	1		2				
Westbury, Wesley	04530731	07	09	1997	2		3				
Vallo, Herman	04530732	10	29	1996	2		4				
<A>	04530733						5				
<A>	04530734						6				
<A>	04530735						7				

Gender (column 4): 1 = Female; 2 = Male
Exclusion Status (column 5): 1 = Students with functional disabilities;
2 = Students with intellectual disabilities; 3 = Non-native language speakers
Participation Status (column 7): C = Participated; A = Absent; P = No parental permission; NA = Left school permanently

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exhibit 4-6. Example of TIMSS eighth-grade teacher tracking form with mock data

T 11 - Teacher Tracking Form - Grade 8

School Name:		Participant Country:					
First Middle School		United States					
		[a]		[b]			
		School ID	Grade				
		0453	8				

①	②	③	④	⑤	⑥	⑦	⑧
Teacher Name	Teacher ID	Link Number	Selected Class ID	Class (Course) Name	Number of Eligible Students	Subject and Questionnaire Code	Questionnaire Return Status
Samantha Lewin	045301	01	045302	Algebra 8B LK	26	1	0
Samantha Lewin	045301	02	045307	General Math 2	32	1	0
Bob Knight	045302	03	045302	Advanced Science 8	7	6	0
Ginny Buchanan	045303	04	04302, 045307	General Science 8	31	6	0
Marsha Howe	045304	05	045302, 045307	General Science 8	20	6	0

Subject and Questionnaire Codes (column 7):

1 = Mathematics; 6 = Integrated Science;

Questionnaire Return Status (column 8):

N = Not completed; R = Returned completed; O = To be completed online

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

4.3 Instruments for TIMSS and PIRLS

All TIMSS and PIRLS instruments were developed by the IEA as a cooperative effort involving representatives from every country participating in the study. For TIMSS, at each grade the primary instruments for TIMSS 2011 consisted of a combined mathematics and science assessment; a student questionnaire; a curriculum questionnaire; a school questionnaire; and teacher questionnaires to be completed by the teachers teaching mathematics and/or science to the students in the sampled classrooms. For PIRLS the instruments included a reading assessment; a student questionnaire; a curriculum questionnaire; a school questionnaire; and teacher questionnaires to be completed by the teachers teaching reading to the students in the sampled classrooms.

The TIMSS assessment instrument took the form of 14 booklets containing mathematics and science items in rotated item blocks. While some of these items have to remain confidential for use in coming TIMSS assessments, others have been released as actual examples of assessment items. TIMSS 2011 items released by the IEA are available on the TIMSS & PIRLS International Study Center website at <http://timssandpirls.bc.edu/timss2011/international-released-items.html> and also the NCES TIMSS website at <http://nces.ed.gov/timss/educators.asp>.

The assessment for PIRLS consisted of 13 booklets and presented items in rotated item blocks. Like TIMSS, some items have to remain confidential for use in coming PIRLS assessments while others have been released as examples of the assessment. PIRLS 2011 items released by the IEA are available on the TIMSS & PIRLS International Study Center website at <http://timssandpirls.bc.edu/pirls2011/international-released-items.html> and also the NCES PIRLS website at <http://nces.ed.gov/surveys/pirls/released.asp>.

The student questionnaire was grade-specific and bound into the assessment booklet with the assessment items for the particular grade. The school questionnaire was designed as an online instrument to be completed by the school principal. In the case of the teacher questionnaires, these were also developed as online instruments. A single fourth-grade online teacher questionnaire was designed for both TIMSS and PIRLS to be completed by the reading and/or mathematics and/or science teachers of the students in the sampled classrooms. Separate questionnaires were provided for the TIMSS mathematics teachers and science teachers of the students in the sampled eighth-grade classrooms. The international versions of the TIMSS questionnaires are available on the TIMSS & PIRLS International Study Center website at <http://timssandpirls.bc.edu/timss2011/international-contextual-q.html>. The international versions of the PIRLS questionnaires are available on the TIMSS & PIRLS International Study Center website at <http://timssandpirls.bc.edu/pirls2011/international-contextual-q.html>. The U.S. versions of all seven U.S.

TIMSS questionnaires and the three PIRLS questionnaires are provided in appendix F of this report and are available on the NCES website at <http://nces.ed.gov/timss/questionnaire.asp> and <http://nces.ed.gov/surveys/pirls/questionnaire.asp> respectively.

The TIMSS Mathematics and Science Assessment and PIRLS Reading Assessment

The following discussion provides a summary of the rationale for and development of the TIMSS and PIRLS 2011 assessments. Complete detail is provided in the *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011) available at <http://timssandpirls.bc.edu/methods/index.html>.

Assessment Frameworks

For both TIMSS and PIRLS 2011, the test development effort began with a revision of the frameworks used to guide the construction of the previous TIMSS 2007 and PIRLS 2006 assessments (Mullis et al., 2005; Mullis et al., 2006). The frameworks were updated to reflect changes in the curriculum and instruction of participating countries (Mullis et al., 2009). Extensive input from experts in mathematics and science education, reading education, assessment, and curriculum, and representatives from national educational centers around the world contributed to the final shape of the frameworks. Maintaining the ability to measure change over time was an important factor in revising the frameworks.

Content and Cognitive Domains

The TIMSS mathematics and science assessments were designed along two dimensions: (1) the topics or content that students are expected to learn and (2) the cognitive skills students are expected to have developed. In TIMSS 2011, the cognitive domains are *knowing*, *applying*, and *reasoning* and are common to each grade and subject area. The content areas differ between grades and subject areas. The mathematics topical or content domains covered at grade 4 are *number*, *geometric shapes and measures*, and *data display*. At grade 8, the mathematics content domains are *number*, *algebra*, *geometry*, and *data and chance*. The science content domains covered at grade 4 are *life science*, *physical science*, and *Earth science*. At grade 8, the science content domains are *biology*, *chemistry*, *physics*, and *Earth science*.

The PIRLS 2011 reading assessment design focused on two dimensions: (1) a content dimension specifying the purpose for reading and (2) a cognitive dimension specifying the cognitive or thinking processes of comprehension. The two content domains assessed in PIRLS, called “purposes of reading,” are *literary experience* and *acquire and use information*. PIRLS assessed students’ reading literacy in four cognitive areas, called “processes of comprehension”: *focus on and retrieve explicitly stated information*; *make straightforward inferences*; *interpret and integrate ideas and information*; and *examine and evaluate content, language, and textual elements*.

Item Development

Approximately one-half of the assessment items used in TIMSS 2007 and in PIRLS 2006 were kept confidential and included in the respective TIMSS and PIRLS 2011 assessments. To replace assessment items that had been released following the 2007 and 2006 assessments, education systems submitted items for review by subject-matter specialists, and additional items were written by the IEA Science and Mathematics Review Committee for TIMSS and the IEA Reading Review Committee for PIRLS, in consultation with item-writing specialists. This expert consultation ensured that the content, as explicated in the frameworks, was covered adequately. Items were reviewed by the Science and Mathematics Item Review Committee and the Reading Item Review Committee and field-tested in most of the participating education systems. Results from the field test were used to evaluate item difficulty, how well items discriminated between high- and low-performing students, the effectiveness of distracters in multiple-choice items, scoring suitability and reliability for constructed-response items, and evidence of bias toward or against individual countries or in favor of boys or girls.

As a result of this review in TIMSS, 144 new fourth-grade items were selected for inclusion in the international assessment. In total, 347 mathematics and science items were included in the fourth-grade TIMSS assessment booklets. At the eighth grade, the review of the item statistics from the field test led to the inclusion of 183 new eighth-grade items in the assessment. In total, 434 mathematics and science items were included in the eighth-grade TIMSS assessment booklets. In PIRLS, 60 new reading items were selected for inclusion in the international assessment. In total, 135 reading items were included in the PIRLS assessment booklets. More detail on the distribution of new and trend items in the TIMSS and PIRLS 2011 assessments can be found in Martin and Mullis (2011).

Assessment Booklets

To keep the testing burden to a minimum while ensuring broad subject-matter coverage, TIMSS used a rotated block design that included both mathematics and science items. This is consistent with other large-scale assessments such as the National Assessment of Educational Progress (NAEP). The rotated item design meant that, while no students responded to all of the items, each student encountered both mathematics and science items during the assessment.

The 2011 fourth-grade assessment consisted of 14 booklets, each requiring approximately 72 minutes of response time. In the TIMSS 2011 booklets the mathematics and science items were each assembled separately into 14 blocks, or clusters, of items. Each block contained either mathematics items or science items only. The secure trend items used in prior assessments were included in eight blocks, with the other six blocks containing new items. Each of the 14 TIMSS 2011 booklets contained four blocks in total.

The 2011 eighth-grade assessment followed the same pattern and consisted of 14 booklets, each requiring approximately 90 minutes of response time. The 14 booklets were rotated among students, with each participating student completing 1 booklet only. The mathematics and science items for TIMSS 2011 were assembled into 14 blocks of items. Each block contained either mathematics items or science items only. The secure trend items used in prior assessments were included in eight blocks, with the other six blocks containing new items. Each of the 14 TIMSS 2011 booklets contained four blocks in total. The TIMSS booklets administered to the state samples were identical to those administered in the national sample.

The PIRLS 2011 assessment was similar in design to TIMSS. The PIRLS assessment consisted of 12 booklets and a reader that was presented in a magazine-type format, with the questions in a separate booklet. Each booklet required 80 minutes of response time. The reading items were assembled separately into 10 blocks, or clusters, of items. Each of the 13 booklets contained one block of literary experience items and one block of informational items, and each block occurred twice across the 13 booklets. The 13 booklets were rotated among students with each participating student responding to only 1 booklet. Six of the 10 blocks were included in previous PIRLS assessments. The remaining 4 blocks were new for PIRLS 2011.

Calculator Use in TIMSS

Calculator use was not permitted during the TIMSS fourth-grade assessment. However, the TIMSS policy on calculator use at the eighth grade was to give students the best opportunity to operate in settings that mirrored their classroom experiences. As a consequence, calculators were permitted, but not required, for the eighth-grade assessment materials. In the United States this meant that students assigned one of the 14 TIMSS 2011 booklets were allowed, but not required, to use calculators.

Background Questionnaires

As in prior administrations, TIMSS and PIRLS 2011 included self-administered questionnaires for principals, teachers, and students. To create the questionnaires for 2011, the 2007 versions of the TIMSS questionnaires and the 2006 versions of the PIRLS questionnaires were reviewed extensively by the national research coordinators from the participating countries as well as a Questionnaire Item Review Committee (QIRC). Based on this review, the QIRC eliminated or revised some questions and added several new ones. Like the assessment items, all questionnaire items were field-tested and the results reviewed. As a consequence, some of the questionnaire items were revised prior to their inclusion in the final questionnaires. The questionnaires requested information to help provide a context for the performance scores, focusing on such topics as students' attitudes and beliefs about learning, their habits and homework, and their lives both in and outside of school; teachers' attitudes and beliefs about teaching and learning, teaching assignments, class size and organization, instructional practices, and participation in professional development activities; and principals' viewpoints on policy and budget responsibilities, curriculum and instruction issues, and student behavior, as well as descriptions of the organization of schools and courses. For 2011, online versions of the school and teacher questionnaires were offered to respondents as the primary mode of data collection. Paper versions were also available. Detailed results from the student, teacher, and school questionnaires are available in the two TIMSS international reports: the *TIMSS 2011 International Mathematics Report* (Mullis et al., 2012) and *TIMSS 2011 International Science Report* (Martin et al., 2012); and in *PIRLS 2011 International Report in Reading* (Mullis et al. 2012).

U.S. Adaptations to the Assessment Items and Questionnaires

Source versions of all instruments (assessment booklets, questionnaires, and manuals) were prepared by the IEA in English and translated by the participating countries into the primary language or languages of

instruction in each country. In addition, it was sometimes necessary to adapt the instruments to better fit language usage, even in countries that use English as the primary language of instruction. Other adaptations to fit national education characteristics were sometimes required as well. All adaptations were reviewed and approved by the IEA to ensure they did not change the substance or intent of the question or answer choices.

U.S. Adaptations to the Assessment Items

As in previous cycles of TIMSS and PIRLS, the U.S. adaptations to the international instruments were minimal and designed to make the assessment more readable to U.S. students without changing the essence of the assessment item. For example, at times names of individuals were changed to more familiar forms (for example, “Ahmed” to “Andrew”), nouns with British origins were changed to their U.S. equivalent (for example, “cinema” to “movie theater”), Imperial English spellings were changed to American English (for example, “organisation” to “organization, “programme” to “program”), and some changes to the text of instructions were also made to better mirror the administration procedures in the United States.

U.S. Adaptations to the School, Teacher, and Student Questionnaires

Adaptations made to the school, teacher, and student questionnaires were of the following five main types:

- changes to general instructions made in the interests of enhancing clarity;
- changes designed to make question text more readable to U.S. students, similar to those made to the assessment items as described above;
- changes to response alternatives where the international response set did not adequately reflect the U.S. context;
- additional questionnaire items included to address particular issues of national interest; and
- International items that were omitted from the U.S. questionnaires because they violated the federal Pupil Privacy Rights Act (for example, questions on bullying and violence in the school).

A detailed list of changes made to the questionnaires is provided in appendix G. Both the original text from the international version of the questionnaire and the changed text from the U.S. version are shown. Text that has been changed in the U.S. version is underlined in that version. Both international and U.S. questionnaire item numbers, or other location indicators, are provided in each instance. Where appropriate, a crosswalk between the U.S. and international versions of the set of response categories of items is provided in the “Comments” column.

Translation and Verification of Instruments

Each country prepared translations of the instruments according to translation guidelines established by the IEA. Since the international versions of the instruments are produced in English, the U.S. did not need to engage in the full-fledged translation required of many nations. However, the adaptations made to the U.S. instruments required verification by the IEA to ensure their suitability for the current cycle of TIMSS and, if trend items, their continuity with previous cycles. Further details on the translation process can be found in Martin and Mullis (2011).

Production of Assessment Booklets and Questionnaires

On receiving IEA approval of the adaptations, Pearson Educational Measurement applied the adaptations to the international questionnaires and item blocks and then assembled the final assessment booklets. Quality control procedures for this process included a review of each adaptation made to the questionnaires and item blocks as well as a full review of the assembled instruments in a final layout proof.

In mid-December 2010, electronic files were sent to the IEA Data Processing Center (DPC) for verification of the national changes and to the TIMSS & PIRLS International Study Center for layout verifications. The student assessment booklets and student questionnaires were printed in scannable form. The teacher and school paper and pencil versions of the questionnaires were printed in non-scannable form.

A similar procedure was applied to the online school and teacher questionnaires. Adaptations were made to the online instruments using software provided by the IEA DPC. A set of output files was produced for each questionnaire, and these were uploaded to a secure server and verified by the DPC.

Scannable Document Preparation and Printing

The student test assessment and student questionnaire were printed as scannable documents combined into 14 single booklets. Document production was divided into two phases. The preparation phase included the mockup and design of forms, typesetting, composition, and editing for text accuracy and process ability. The production phase included final platemaking, printing, binding, and any finishing procedures (counting, wrapping, etc.) that were required prior to packaging and distribution.

After a form was created, it was thoroughly inspected for grammar, spelling, and punctuation to ensure that it matched the approved electronic files. Subsequently, copies of these proofs were subject to a technical review of “scan ability,” oval placement, and spine code assignment. Immediately after printing, sample documents were selected from predetermined locations throughout the print run for testing. Before shipping, a sample from each carton of multipage documents was inspected to ensure that the pages of the booklets were in the correct sequence. After binding, all documents were boxed to assure that material quality was maintained during transit.

Preparation and Printing of Non-Scannable Documents

The teacher and school questionnaires were produced as non-scannable documents. In a first stage proofs of each document were reviewed against the original electronic files. Once accuracy was certified, printing was initiated. During this process staff checked a 10 percent sample of the printed form against the approved document to ensure that accuracy was maintained throughout the printing process.

Online Questionnaires

Once verified, each questionnaire was loaded to an NCES server and thoroughly tested by NCES and Westat to ensure that responses were being captured correctly and that the instruments were functioning properly.

4.4 Field Operations

The activities discussed here refer to those associated with the administration of the assessments in participating schools. In the United States the administration of the assessments was carried out by

professional staff trained according to the international guidelines. School personnel were asked only to assist with listings of students, the identification of school space for the assessment, and the specification of parental consent procedures needed for sampled students.

Field operations centered on three main tasks: recruiting and training of field staff; scheduling the assessments; and administration of the assessments within the schools.

Many of the gaining cooperation staff working on the recruitment of districts and schools were retained for the assessment phase of the study. However, it was necessary to recruit additional staff at the test administrator's level from the pool of experienced Westat field staff. All had previous experience with other educational assessments in schools, and all had FBI clearance based on fingerprint and background checks. Test administrators also signed a statement of nondisclosure indicating that they would maintain confidentiality of all survey materials and of the data collected. The test administrators recruited local assistant administrators to assist in the administration of the assessment since in most schools two separate classrooms were assessed simultaneously. Assistant administrators were also experienced with the administration of educational assessments in schools and held the same kind of FBI clearance. They too signed confidentiality statements.

The total complement of field staff consisted of four field managers, 135 test administrators, and 135 assistant administrators. The field managers reported directly to the Westat home office and met weekly to discuss progress and any problematic issues arising in the field. Test administrators reported to a field manager who coordinated and monitored their work and, in turn, the test administrators coordinated and supervised the work of the assistant administrators.

Responsibilities of Field Managers, Test Administrators and Assistant Administrators

Field managers involved in the data collection phase had responsibility for

- providing input to the TIMSS and PIRLS data collection training;
- tracking the test administrators' receipt of assessment booklets and other materials;
- coordinating data collection activities undertaken by their assigned test administrators;
- holding weekly one-on-one telephone meetings with their test administrators to monitor progress and to troubleshoot any problems arising;

- ensuring that their test administrators followed TIMSS and PIRLS procedures and guidelines; and
- reporting progress and problems in weekly conference calls with Westat home office staff and other field managers.

Test administrators had responsibility for

- attending TIMSS and PIRLS data collection training;
- receiving and securing assessment materials;
- training assistant administrators;
- preparing and assigning assessment materials for students;
- collecting the completed school and teacher questionnaires;
- conducting the assessment according to TIMSS and PIRLS specified procedures;
- completing the Test Administration Form, Student Tracking Form, Teacher Tracking Form, and Student Response Rate Form;
- determining if a follow-up session was needed;
- securing, packing, and shipping all assessment materials to Pearson at the conclusion of the assessment;
- recording the status of the assessment in the Field Management System; and
- reporting progress to their field manager on a regular basis.

Assistant administrators had responsibility for

- attending the TIMSS and PIRLS training conducted by their test administrator;
- administering the assessment according to TIMSS and PIRLS specified procedures;
- completing the Test Administration Form, Student Tracking Form, Teacher Tracking Form, and Student Response Rate Form; and
- consulting regularly with their test administrator.

Training

A 2-day, in-person training for test administrators was held on March 18 and 19, 2011. The attendees received the Test Administrator Manual 5 days prior to the training session and were given four paid

“study hours” to become familiar with the information prior to training. The agenda for this training session is provided as exhibit E-1 in appendix E.

Since TIMSS and PIRLS were very similar in terms of general procedures, the training was centered on TIMSS eighth-grade. TIMSS at grade 4, the TIMSS-NAEP Link, and PIRLS were referenced at specific times where a unique training point needed to be made or when procedures differed. The first day of training focused on the responsibilities of a TIMSS test administrator, TIMSS data collection materials from the perspective of item security and student privacy, the Preassessment Call Checklist, and entering preassessment call information into the FMS. The second day included discussion about the procedures to be followed in preparing for, arriving on, and conducting the assessment day, what to do once the assessment was completed, and the appropriate methods for packing and shipping the assessment materials to Pearson. Subsequently, the focus shifted to the PIRLS, TIMSS, and TIMSS-NAEP link administrative duties. At the end of day 2, test administrators received their initial assignments and met with their field managers to address questions and other administrative details.

Field staff were assigned laptop computers to take with them for the duration of TIMSS and PIRLS data collection. Printers for use with the laptops were issued and sent to each test administrator after training. Test administrators were also provided with an official TIMSS 2011 photo ID badge to wear while representing TIMSS and PIRLS in the schools.

Training for assistant administrators (AAs) was conducted as a separate exercise by their respective test administrator. Approximately 2 hours was allocated for this training. Training materials consisted of an Assistant Administrator Manual, session scripts, and a subset of material from the test administrator training.

Scheduling Assessments

The 1,240 schools taking part in TIMSS and PIRLS 2011 were dispersed across the country, although with concentrations in the more populous states and cities. Scheduling assessment dates for these schools required the optimization of school preferences for a particular date with the assessment date preferences of nearby schools and the location of field staff in an effort to keep travel and related expenses to a minimum. The basic approach adopted involved the geographic mapping of schools and assignment of a preliminary date, along with the location of field staff. This formed the foundation for discussions with schools, and the assignment of schools to field staff. In essence, geographical clusters of schools were assigned assessment dates clustered in time insofar as this was possible.

Obtaining Assessment Dates From Schools

Prior to recruitment of schools, Westat staff collected date information for the sampled schools, including dates associated with state testing, holidays, breaks, field trips, and the like. This information was used to set a tentative date for each school.

Mapping Schools

In a second step a geographic map of participating grade 4 and grade 8 schools was developed based on the addresses of the schools. The map allowed the ready identification of obvious clusters of schools in large metropolitan areas and also allowed for identification of less concentrated clusters in broader geographical areas as well as isolated schools. To establish optimal work areas for assessment administrators, geographic clusters of schools were defined in an iterative process that took into account the location of field staff and their caseload. A total of 134 work areas of varying size were identified in this way.

Assigning Tentative Assessment Dates

The provisional assessment dates were then mapped to the schools in each cluster and represented in a spreadsheet. Within clusters, assessment dates were balanced against the location of schools in relation to one another. With some minor modifications to work areas, schools in relatively close proximity were assigned to provisional assessment weeks. This process identified smaller clusters of schools that could be assessed within a week without undue travel and related expenses. For the most part, assessments were scheduled on Tuesday through Thursday, leaving Monday and Friday as travel days.

Negotiating Final Assessment Dates

Once tentative dates were established, field staff contacted schools to negotiate a final assessment date. For the most part, schools accepted the dates proposed. When this was not possible, field staff used the work area spreadsheet and a work area map to negotiate an alternative assessment date that would minimize staff travel. Final assessment dates and times were confirmed by email with the school coordinator.

Assignment of Schools to Test Administrators

For the most part, field staff were assigned a work area based on their location and availability with most work areas relatively close to the test administrator's home address. Balancing these several demands resulted in some variation in the caseload of test administrators. During the course of the assessments, which ran from March 2011 through to June 2011, some reassignments of schools and/or work areas were necessary.

Troubleshooting

Fifteen of the test administrators and 42 assistant administrators were recruited as regional troubleshooters who would be available to cover last-minute changes in assessment dates, staff illnesses, and the like. Each of these staff also had their own assignments, essentially schools that did not easily fit into an identified work area or assessment date window.

The Assessment and Related Activities

Field staff engaged in a number of activities in advance of the actual assessment. These included

- working with the school coordinator to gain the permission of parents and students, if this was required by the school;
- making arrangements with the school for the assessment sessions; and
- obtaining the materials to be used in the assessment.

Recruiting Parents and Students

During recruitment and scheduling contacts with schools, field staff asked about district and/or school requirements for notifying parents about their child's participation in TIMSS. School requirements fell into the following three main categories:

- **Notification.** The school would simply send parents a notification of the child's participation in TIMSS along with some informational material;

- **Passive consent.** The school was required to ask parents for permission for the child to participate but permission would be assumed unless there was a formal objection; and
- **Active consent.** The school was required to ask parents for permission for the child to participate and the child could not participate until the parents provided formal approval.

A majority of schools (956) opted for parent notification. Nearly 400 schools used passive consent and a further 50 used active consent.

To assist schools in this task the school coordinator was provided with three draft letters to parents, one for each of the three forms of parent permission. These letters could be edited as appropriate and sent out on school stationery. Consent forms to accompany the passive and active consent letters were also provided along with an information sheet describing TIMSS. English and Spanish versions of each of these documents were made available to the schools. Copies of these materials as they apply to fourth-grade students and eighth-grade students are provided as exhibits C-6 through C-8 in appendix C. The eighth-grade materials were essentially the same.

Organizing the Assessment Session at the School

Approximately 2 weeks prior to each school's assessment date, the test administrator called the assigned school coordinator. Using a Preassessment Call Log, test administrators were instructed to verify previously obtained information on items such as the school's address, principal's name, assessment date, session location, requirements for entering the school, and parking arrangements as well as the status of the within-school sampling forms for the school. The information obtained was maintained within the School Folder and updated as a basic reference. The Preassessment Call Log is provided as exhibit E-2 in appendix E.

On assessment day each test administrator, accompanied by an assistant administrator, arrived at the school with all of the materials needed for the assessment. One session box of materials was provided for each of the sampled classes. Each session box contained the estimated number of student assessment booklets required, plus three unassigned booklets to accommodate any changes in class enrollments. Upon arrival, the test administrator met with the school coordinator to make any updates to the Student Tracking Form that would affect the preparation of student materials (for example, the addition of new students, the withdrawal of listed students from the school or class, or a change in exclusion status of a sampled student).

Test administrators arrived at the school about an hour before the scheduled assessment to prepare booklets for distribution and take care of other arrangements for the assessment. Following the prescribed international procedures, the test administrator did not open the booklet bundles until 45 minutes before the assessment. At that time, the booklets were assigned to students in the random order established by the IEA sampling software, and labels were placed on the booklets. TIMSS pencils were provided to all students. As required by international rules, simple-function calculators were provided at the eighth-grade level only, and then only at the discretion of the school. Students kept the TIMSS pencils as gifts, but calculators distributed during the assessments were collected with the booklets after the assessment.

Administering the Assessment

Assessments were administered by reading verbatim from a standardized script according to the instructions in the TIMSS & PIRLS Test Administrator Manual. A copy of each of the sessions scripts are provided in appendix E. The script began with a brief introduction to the study. The assessment booklets, each in a security envelope, then were distributed. The students were instructed to remove their booklet from the envelope, and the general instructions and instructions for Part 1 were read. Following this, the students were instructed to begin Part 1 of the assessment. After 36/45 minutes (grade 4/grade 8), a short break was provided. After the break, the instructions for Part 2 were read and students were instructed to begin Part 2 of the assessment. After the allotted 36/45 minutes for this part of the assessment, students were instructed to stop work, and a longer break was provided. Following the break, the student questionnaire was administered; it was not time-limited but was typically completed in about 30 minutes.

Postassessment Activities

Following the assessment, test administrators instructed the students remove an identifying label from the cover of the booklet, place the booklets in the security envelope, and seal it. The students handed their booklets to the administrator, received their gift, and were dismissed. The test administrator then recorded participation codes for each session and packed the booklets and school and teacher questionnaires into the shipping box. The test administrators made copies of the Student Tracking Form and the Session Report Form, placing the original documents in the TIMSS and/or PIRLS Storage Envelope to be kept at the school. To maintain the security of student names, the test administrator removed and destroyed the column of student names from the copies of the STF and placed the de-identified STF and Session Report

Form in with the assessment booklets and questionnaires. The session materials were sealed and shipped to Pearson.

4.5 Receipt Control, Scoring, Coding, and Data Entry

As noted previously, field staff sent the completed assessments and questionnaires along with any related materials directly to Pearson following the completion of the assessment session at a school. Pearson then recorded the receipt of materials, scored the open-ended responses in the assessment, coded the multiple-choice assessment items and the questionnaire responses, and created data files from this information.

Receipt Control

TIMSS and PIRLS documents were received at Pearson from April 6 to June 3, 2011. As assessment materials were returned to Pearson, receipt dates were recorded and sent to Westat weekly. Pearson also provided Westat with updated assessment information taken from the Student Tracking Forms.

For TIMSS Pearson checked in and processed materials from approximately 370 grade 4 and 501 grade 8 national schools. Pearson processed an additional 103 grade 4 and 395 grade 8 state schools in Florida and North Carolina that participated as benchmarking states. School personnel could complete their teacher and school questionnaires online or return them with the assessment booklets. Those returned to Pearson were entered by project staff into the NCES secure website.

For PIRLS Pearson checked in and processed approximately 13,400 assessment booklets from 370 schools in the national sample. Approximately 2,000 additional booklets from 57 schools in Florida were also processed. Again, school personnel could complete their teacher and school questionnaires online or return them with the assessment booklets. Those returned to Pearson were entered by project staff into the NCES secure website.

Receipt Control System Specification

Two systems were used to monitor the receipt and processing of materials after the assessments—the Process Control System and the Work Flow Management system. These systems enabled project staff to determine the status of any selected school; verify that materials from a completed school had been

received; identify discrepancies in student or school information; and obtain information on the status of data processing activities for a particular batch of materials.

The Process Control System was modified to monitor the status of all sampled schools and test materials for each study. The Process Control System contained a list of all participating schools and the completion status of the schools for the TIMSS and PIRLS assessments. Shipments were returned packaged in their original boxes, with a barcoded label, applied prior to shipping the booklets out for the assessment, containing the school ID. The barcode was scanned upon arrival at Pearson. A receipt report was run each day and forwarded to the Westat home office on a weekly basis.

When shipments were received staff checked each shipment to verify that the contents of the box matched the school indicated on the label. Each shipment was then checked for completeness and accuracy based on procedures outlined in the IEA Survey Operations Manual. Any discrepancies were recorded and project staff alerted to determine the cause. Once a shipment was opened and verified as being complete, the documents were organized into work units and batched. The computerized Work Flow Management System was used to track the documents through every processing step, thus enabling project staff to easily locate materials for a particular school.

Booklet Accountability

Prior to the distribution of materials, all assessment instruments were organized into bundles and scanned to a file that was used to control distribution to field staff or a particular school. This assignment was recorded in the Materials Distribution System.

When the return shipments were received, a manual count was made to ensure that all booklets from the original bundle were there. The assessment booklets were submitted for scanning and key entry, and unused booklets were batched and the booklet identification barcode scanned. This file and the processed documents file were compared to the original bundle security file created before distribution. A list of unmatched booklet identification numbers was printed in a report used to confirm any nonreceipt of individual booklets.

After the batches of documents had successfully passed the coding and editing process, they were sent to the warehouse for storage. The storage locations of all documents were recorded on the inventory control system, which permits the rapid retrieval of any document, should it be necessary. Unused materials were

sent to temporary storage until the study was completed and the data files accepted by the Westat home office, at which time the extra inventory was destroyed.

Scoring the Assessment Items

The TIMSS and PIRLS assessment items included both multiple-choice and constructed-response items. Scoring rubrics developed internationally following the field tests of the assessment items were available to guide the scoring of each constructed-response item. In the United States, the scoring of the open-ended student responses according to these rubrics was the responsibility of Pearson.

Training

Two subject-specific scoring directors participated in the TIMSS training sessions sponsored by IEA, and an additional scoring director participated in the PIRLS training sessions. Materials from these sessions along with additional materials constructed specifically for this purpose were used to train team leaders and supervisors. There were 10 scoring supervisors for TIMSS. All were hired based on their experience with similar mathematics and science scoring projects. Pearson hired 78 scorers for TIMSS organized into 12 teams, with 6 to 8 scorers per team. For PIRLS, two scoring supervisors were hired along with 18 scorers organized into two teams of 9.

Training activities for the scorers followed the same routine, with supervisors leading each small team reading the item prompt; reading the rubric or scoring guide aloud; reading aloud each of the anchor papers and explaining the reasoning behind the score; allowing the scorers time to complete the practice papers; reviewing each of the practice papers; and opening individual scoring on the electronic Performance Evaluation Network (ePEN). Training on and scoring of the items was completed one at a time, with the exception of the linked items, which were scored together.

Scoring

Each team worked on different items. Scorers were able to view only the one active item that they were assigned by their supervisors and were not able to score other items from any other team. The exception was with the linked items from the “themed” blocks. In this situation a question or questions required reference to a previous answer. For instance, question 4 in the block may have required data or the answer

from questions 1 and 2 in order to answer the question. In this situation, the ePEN setup was designed so that the scorer had access to screens with all of the pertinent responses, again only as assigned by the supervisor. The answers could not be submitted to ePEN until all questions from the set were scored to make sure that the scorer had all the needed information to score all related items.

Scoring quality was monitored continuously. The ePEN system allowed inter-rater reliability reports to be run almost as soon as scoring began. Another monitoring method used was back-reading of already scored responses. This allowed the scoring supervisor to look at responses by category. The scoring supervisor also could review responses either by scorer or by score point agreements or splits. Scoring supervisors checked completion statistics as well.

Cross-Country Scoring Reliability Study

In international assessments, it is also important to gather information about how reliably the scoring was conducted from country to country so that valid international comparisons can be made of students' achievement. To document the reliability of constructed-response scoring across both TIMSS and PIRLS countries, a cross-country scoring reliability study was conducted. Responses to TIMSS and PIRLS items from Southern Hemisphere countries were sent to the Northern Hemisphere countries for scoring. After the scoring of the U.S. responses for an item with their team, two scorers then completed scoring of the international responses that were preloaded on desktop computers. After training and successfully scoring a portion of the 2011 responses, select scorers were asked to score all the responses for an item. While the individuals making up the pairs varied, no scorer worked on items that he or she had not been trained to score.

Trend Scoring

To document the reliability of constructed-response scoring from TIMSS 2007 to TIMSS 2011 and PIRLS 2006 to PIRLS 2011, both TIMSS and PIRLS included a trend scoring reliability study. For each assessment, the study estimates the degree of agreement between the 2011 scorers and the scorers from the previous assessment. It allows scorers of the TIMSS and PIRLS 2011 assessment to score student responses collected in 2007 and 2006, respectively, and compare their scores to those given in TIMSS 2007 and PIRLS 2006. The TIMSS and PIRLS 2011 scorers scored a subset of student responses from the TIMSS 2007 or PIRLS 2006 instruments. Student responses were actual student responses to items collected during the TIMSS 2007 and PIRLS 2006 assessments in the U.S.

The IEA Data Processing Center (DPC) assembled a sample of student responses to be scored and distributed it to each participating education system along with the IEA Trend Scoring Reliability Software (TSRS). Only education systems participating in 2011 that also participated in TIMSS 2007 or PIRLS 2006 took part in the trend scoring reliability study. There were 44 grade 4 items and 50 grade 8 items for TIMSS trend scoring. There were 33 PIRLS items for trend scoring.

A qualification set of 50 responses for each selected trend item for both TIMSS and PIRLS (or item part) was assigned to each scorer. After 25 responses were scored per item (item part), the trend reliability between the trend item was evaluated. The goal was to have between 85 percent to 100 percent agreement among scorers. If agreement for any item was below 85 percent for a particular scorer, retraining was required for the corresponding scorer and item. The scorer was then required to score the entire qualification set of 50 responses, rescoring the initial set of 25. If the scorer's agreement level reached 85 percent then the scorer began scoring 2011 student responses and the trend reliability set of responses.

A total number of responses (200) were divided equally by the number of scorers who were assigned to the item block. The main trend reliability scoring process took place in parallel with the main study scoring for TIMSS and PIRLS 2011.

Scanning the Student Questionnaire Responses

Responses to the TIMSS and PIRLS student questionnaire items were scanned with optical-scanning equipment that also captured images of the constructed-response items and intelligent character recognition (ICR) fields. The data values captured from booklets and questionnaires were coded as numeric data. Unmarked fields were coded as blanks and the editing staff was alerted to missing or encoded critical data. The images of constructed-response items were saved as a digitized computer file. In addition to capturing the student responses, the barcode identification numbers used to maintain process control were decoded and transcribed to the TIMSS and PIRLS computerized data file. ICR was used to read various hand and machine printing on the assessment booklets and student questionnaires. Image clips of the fields on the booklet covers were displayed to online editing staff for verification. Image clips were also taken for the open-ended items to be used for scoring.

Key-Entry of Teacher and School Questionnaire Responses

For school and teacher questionnaires received as hard copy, the questionnaire data were entered directly into the online questionnaire for that school or teacher.

Data Validation

Student booklets. Each data set produced by the scanning system was validated for type and range of response. The data-entry and resolution system used was able to simultaneously process a variety of materials from all age groups, subject areas, and assessment booklets as the materials were submitted to the system from scannable media.

The data records in the scan file were organized in the same order in which the paper materials were processed by the scanner. As the program processed each record within a batch from the scan file, it wrote the edited and reformatted data records to the pre-edit file and recorded all errors on the edit file. The program generated an online edit file of the data problems and resolution guidelines. Image clips requiring edits were routed to online editing stations for the imaged scanned documents.

All data values that were out of range were read “as is” but were flagged as suspect. All data fields that were read as asterisks (*) were recorded on the online edit file. Since the asterisk code indicated a double-response, these items were identified for possible resolution by editing staff. Each field was validated for range response and any values outside of the specified range. Corrections were made immediately. The system employed an edit/verify system, which meant two different people viewed the same suspect data and operated on it separately. The verifier made sure the two responses (one from either the entry operator or the ICR engine) were the same before the system accepted the item as being correct. If it could not be determined, it was escalated to a supervisor.

When the edit process produced an error-free file, the booklet ID number was posted to the TIMSS and PIRLS tracking file by grade and school. This permitted staff to monitor the TIMSS and PIRLS processing effort by accurately measuring the number of documents processed. The posting of booklet IDs also ensured that a booklet ID was not processed more than once.

File Creation and Consistency Checks

In a final step the data from the assessment score files were merged with the student scanned data. At this time, final output files were produced for each file type. The final files were checked to ensure the data were in the correct format. In earlier editing functions, data were checked for completeness and compliance with codebook specifications. In addition, a check was performed to verify correct linking and matching of student, teacher, and school data files. Student and teacher files were loaded in the WinDem software such that all data from the assessments and questionnaires were available in the format required by IEA.

4.6 Data Preparation

As noted in the previous section, the data collected for TIMSS and PIRLS 2011 were entered into data files according to a common international format, as specified in the WinDEM data entry software. The software facilitated the checking and correction of data by providing various data consistency checks

The data files in this format were sent to the IEA Data Processing Center (DPC), where they were subjected to an extensive series of data cleaning and consistency checks. The overriding concern of these checks was to ensure that all information in the database conformed to the internationally defined data structure, national adaptations to questionnaires were reflected appropriately in the codebooks and documentation, and all variables used for international comparisons were comparable across countries.

International Data Cleaning Procedures

The DPC was responsible for checking the data files from each country, applying standard cleaning rules to verify the accuracy and consistency of the data, and documenting electronically any deviations from the international file structure. Queries arising during this process were addressed to national centers, and this process was repeated as necessary to ensure the data were consistent and comparable within and between countries.

Following this cleaning step, countries were provided national univariate and reliability statistics along with data almanacs containing international univariate statistics and item statistics. This allowed countries to examine their data with those of other participating nations. Once any problems arising from this

examination were resolved, sampling weights produced by Statistics Canada and IRT-scaled student proficiency scores in mathematics and science were added to the file.

Detailed information on the entire data entry and cleaning process can be found in Martin and Mullis (2011).

Data Confidentiality Safeguards

While the National Center for Education Statistics (NCES) and data contractors routinely pledge confidentiality to respondents, over the past decade concerns about the potential for disclosure of information about individual survey respondents have increased. These concerns are reflected in new laws enacted since the Privacy Act of 1974 to further ensure the protection of confidential data. The Education Sciences Reform Act of 2002 explicitly requires that NCES protect the confidentiality of all those responding to NCES-sponsored surveys so that no individual respondent can be identified. More specifically, NCES Standard 4-2, *Maintaining Confidentiality* (NCES, 2002), provides guidelines for limiting the risk of data disclosure for data released by NCES. Data disclosure occurs when an individual respondent has been identified through the use of the survey item responses and other external data sources. The procedures used to reduce the risk of data disclosure for TIMSS and PIRLS 2011 in accordance with the guidelines specified in NCES Standard 4-2, are described below.

All students, teachers, and schools participating in TIMSS and PIRLS 2011 do so with the assurance that their identities will not be disclosed. Confidentiality procedures in place included the following:

- All employees with access to the data signed affidavits of data confidentiality.
- Questionnaires were sealed by students after completion.
- Names of students, teachers and schools were removed by field staff from the assessment booklets, the questionnaires, and all other related materials, and replaced with unique identification numbers.

In addition to data collected directly from schools, teachers, and students, additional information was used during the TIMSS and PIRLS sampling, data collection, and weighting processes, and these variables also were considered as part of the review to determine disclosure risk levels.

The confidentiality analysis review described below used the following three-step process to reduce disclosure risk:

- Determining the disclosure risk arising from existing external data;
- Creating a derived variable for race; and
- Swapping the data.

In this process additional assurance is provided that individual schools, teachers, and students participating in TIMSS or PIRLS could be not identified through comparison with public data collections once the TIMSS data are released for public use. While no public data collections identify students or teachers by name, three publicly available data collections do identify schools by name. These are the Common Core of Data (CCD), a detailed public school listing; the Private School Survey (PSS), a detailed private school listing; and the Quality Education Data (QED) produced by Market Data Retrieval (MDR), a privately owned education research firm. The QED data contains a school-based file that provides demographic information for both public and private schools along with the names of the schools. Thus, there is some possibility that schools at least, and perhaps teachers and students as well, could be identified if comparisons of these data sets with the TIMSS data set allowed the identification of schools.

Leaving aside the question of why anyone would want to do this, it might be possible to identify TIMSS and PIRLS schools by taking variables from the TIMSS and PIRLS school data and searching the publicly available data files (QED, CCD, and/or PSS files) for schools with a matching profile. However, because the variables in the TIMSS and PIRLS data files were obtained from responses to the school questionnaire, for the most part, exact profile matches are unlikely. Even then, one would not know for certain whether any of the matched schools were the actual TIMSS and PIRLS schools or whether the match had simply arisen by chance.

Nevertheless, school matching analyses were undertaken using probabilistic matching algorithms approved by the Institute of Education Sciences Disclosure Review Board (DRB) for use in disclosure analyses. These algorithms identify schools with some potential for identification. To provide further protection, elements of the data from schools identified as “disclosure risks” in this way were perturbed using the procedures approved by the DRB. After perturbation, the data were subjected to another round of analyses to ensure that the potential for identification no longer existed.

An additional measure was taken to reduce further the risk of disclosure of an individual respondent. This measure is referred to as data swapping, a DRB requirement that reduces risk by modifying microdata. In data swapping, a probability sample of records is paired with other records on the file using selected characteristics, and then some identifying variables are swapped between pairs of records (see Kaufman et al., 2005). The sampling rate for TIMSS and PIRLS swapping was designed to protect the confidentiality of the data without affecting the usability of the data set. All questionnaire data (school, teacher, and student) were involved in the swapping. This method is an effective way of keeping as much valuable data as possible while protecting respondent identity. Swapping preserves the univariate frequencies, means, and variances, although it may affect multivariate relationships a little. Pre- and post-swapping percentage distributions (unweighted and weighted) and correlations were reviewed to ensure data quality was maintained.

Confidentiality analyses of this kind were conducted before the U.S. data files were delivered to the DPC for cleaning, and prior to the IRT scaling and estimation of sampling weights.

The Estimation of TIMSS and PIRLS Student Proficiencies

All cycles of TIMSS and PIRLS used item response theory (IRT) methods to produce score scales that summarized the achievement results. With this method, the performance of a sample of students in a subject area or sub-area could be summarized on a single scale or a series of scales, even when different students had been administered different items.

IRT scaling provides estimates of item parameters (for example, item difficulty and item discrimination) that define the relationship between the item and the underlying variable measured by the test. Parameters of the IRT model are estimated for each test item, with an overall scale being established as well as scales for each content area and cognitive domain specified in the assessment framework.

To allow for the calculation of trends in achievement, comparisons of scores across the five TIMSS assessments conducted in 1995, 1999, 2003, 2007, and 2011 and comparisons of scores across the PIRLS assessments conducted in 2001, 2006, and 2011 were necessary. To this end achievement scores from all five TIMSS assessments were placed on the same scale. The three PIRLS cycles were subjected to the same treatment. Details are provided in *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011).

Plausible Values

During the scaling phase, plausible values were used to characterize scale scores for students participating in the assessment. To keep student burden to a minimum while ensuring content coverage, TIMSS and PIRLS administered a limited number of assessment items to each student—too few to produce accurate scale scores for each student. To account for this, TIMSS and PIRLS generated five possible scale scores for each student, each representing a random selection from the distribution of scale scores of students with similar backgrounds who answered the assessment items the same way.

This plausible-values methodology was used to represent what the true performance of an individual might have been, had it been observed. This is done by using a small number of random draws from an empirically derived distribution of score values based on (a) the student's observed responses to assessment items and (b) background variables. Each random draw from the distribution is considered a representative value from the distribution of potential scale scores for all students in the sample who have similar characteristics and identical patterns of item responses. The draws from the distribution are different from one another to quantify the degree of precision (the width of the spread) in the underlying distribution of possible scale scores that could have caused the observed performances. The TIMSS and PIRLS plausible values function like point estimates of scale scores for many purposes, but they are unlike true point estimates in several respects. They differ from one another for any particular student, and the amount of difference quantifies the spread in the underlying distribution of possible scale scores for that student.

This approach to the estimation of scale scores ensures that the estimates of the average performance of student populations and the estimates of variability in those estimates are more accurate than those determined through traditional procedures, which estimate a single score for each student. An accessible treatment of the derivation and use of plausible values can be found in Beaton and González (1995). A more technical treatment can be found in *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011).

International Benchmarks

International achievement benchmarks were developed to provide a concrete interpretation of what the scores on the TIMSS mathematics and science achievement scales and on the PIRLS reading scales mean. TIMSS and PIRLS each used scale anchoring to summarize and describe student achievement at four points on the mathematics, science, and reading scales—*Advanced* (625), *High* (550), *Intermediate* (475),

and *Low* (400). Scale anchoring involves selecting benchmarks (scale points) on the TIMSS and PIRLS achievement scales to be described in terms of student performance and then identifying items that students scoring at the anchor points can answer correctly. Subsequently, these items are grouped by content area within benchmarks and reviewed by mathematics, science, and reading experts. These experts focus on the content of each item and describe the kind of mathematics, science, or reading knowledge demonstrated by students answering the item correctly. The experts then provide a summary description of performance at each anchor point leading to a content-referenced interpretation of the achievement results. Detailed information on the creation of the benchmarks is provided in the “Using Scale Anchoring to Interpret the TIMSS and PIRLS 2011 Achievement Scales” section of *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011).

The Estimation of Sampling Weights

Because of the complex sampling design used in TIMSS and PIRLS, students were assigned sampling weights. In general the sampling weight assigned to a student is the inverse of the probability that the student would be selected for the sample. When responses are weighted, each contributes to the results for the total number of students represented by the individual student assessed. Weighting also adjusts for school and student nonresponse. The internationally defined weighting specifications for TIMSS and PIRLS require that each assessed student’s sampling weight should be the product of

- the inverse of the school’s probability of selection;
- an adjustment for school-level nonresponse;
- the inverse of the classroom’s probability of selection; and
- an adjustment for student-level nonresponse.

Sampling weights should be used in all TIMSS and PIRLS analyses. A detailed description of this process is provided in *TIMSS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013) and the *PIRLS 2011 User Guide for the International Database* (Foy & Drucker, 2013).

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5. The TIMSS and PIRLS 2011 Data for the United States and Benchmarking States

The TIMSS and PIRLS 2011 international databases contain student achievement data as well as student, teacher, school, and curricular background data for 54 countries and 11 other education systems for TIMSS, and 40 countries and 12 other education systems for PIRLS 2011. These databases provide comparable data across education systems on detailed measures of student achievement in mathematics and science for TIMSS participating education systems¹⁶ detailed measures of achievement in reading for PIRLS participants; information on educational practices and student outcomes; links between student achievement and background information from students, teachers, school principals, and curriculum experts; and achievement scales on a metric that is common to all cycles of TIMSS and PIRLS respectively, allowing for the analysis of trends.

5.1 U.S. International, National, and State Benchmarking Data Files

The TIMSS and PIRLS 2011 national data for the United States exist in the following three forms:

- **U.S. international data files**, which are part of the TIMSS and PIRLS international database and are directly comparable to that of other nations. As such these files allow for comparisons of the United States with any of the other education systems participating (except participating U.S. states) in TIMSS and/or PIRLS in virtually all respects. These files are available from the TIMSS and PIRLS International Study Center as SAS export files or SPSS “.sav” files through <http://timssandpirls.bc.edu/timss2011/international-database.html> (TIMSS) or <http://timssandpirls.bc.edu/pirls2011/international-database.html> (PIRLS). Note that these data files do not include the U.S.-specific adaptations made to a few questions in the questionnaires or the additional questions added to the school and student questionnaires, such as the question on race/ethnicity added to the student questionnaire. Data for U.S. states are not included in the international data files due to potential confidentiality issues.
- **U.S. national public-use data files**, which include the U.S.-specific adaptations that are not part of the U.S. international data files. These adaptations affect only a few variables and take the form of some elaboration of international response alternatives in a few items and the addition of questions to each of the questionnaires. These additional questions are described in section 5.9.2 of this report. The U.S.-specific TIMSS data files are available separately from the National Center for Education Statistics by download from <http://nces.ed.gov/timss/datafiles.asp>. The U.S.-specific

¹⁶Data for U.S. states are not included in the international data sets due to data confidentiality issues.

PIRLS data files are available separately from the National Center for Education Statistics by download from <http://nces.ed.gov/surveys/pirls/datafiles.asp>. Because the U.S. national files differ little from their international counterparts, the bulk of the variables describing U.S. students, teachers, and schools are as described in the *TIMSS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013) and the *PIRLS 2011 User Guide for the International Database* (Foy & Drucker, 2013). These are the most comprehensive and detailed references for the TIMSS and PIRLS 2011 data and should be seen as the primary reference.

- **U.S. national restricted-use data files**, which can only be obtained by completing a restricted-use license agreement with NCES. The restricted-use data files are provided only on CD. These datasets contain the supplemental link files that link TIMSS or PIRLS school ID numbers to the school ID numbers as they appear in the publicly available Common Core of Data (CCD) or the Private School Universe Survey (PSS). In addition, race/ethnicity is provided with all available categories and free or reduced price lunch is provided as a continuous variable. Because these data can reveal the identities of participating schools, the restricted-use data files are only made available to those who obtain a NCES restricted-use data license. Directions on how to obtain the license can be found at <http://nces.ed.gov/pubsearch/licenses.asp>.

Data for the nine states that participated in TIMSS and/or PIRLS are provided in one format:

- **State restricted-use data files**, which can only be obtained by completing a restricted-use license agreement with NCES. The restricted-use data files are provided only on CD. Like the U.S. national restricted-use data files, these datasets contain the supplemental link files that link TIMSS or PIRLS school ID numbers to the school ID numbers as they appear in the publicly available Common Core of Data (CCD) or the Private School Universe Survey (PSS). In addition, the state data files also contain the state-level data parallel to the U.S. national public-use files. Because these data can reveal the identities of participating schools, the restricted-use data files are only made available to those who obtain a NCES restricted-use data license. Directions on how to obtain the license can be found at <http://nces.ed.gov/pubsearch/licenses.asp>.

The discussion that follows is designed to provide the following:

- a summary overview of sections of the TIMSS 2011 User Guide for the International Database and the PIRLS 2011 User Guide for the International Database as these relate to using the U.S. data files;
- documentation of U.S. national items that differ from their international versions in the U.S. and state files; and
- a description of U.S. national items that are unique to the U.S. national and state files.

5.2 TIMSS and PIRLS Data Files

The following five basic types of data files are available for each education system in both the TIMSS and PIRLS international datasets:

- achievement files containing item response data and scale scores for the TIMSS or PIRLS assessment;
- background files with information from students, from their mathematics and science teachers in TIMSS or their reading teachers in PIRLS, and from the principals of their schools;
- student-teacher linkage files that contain the information needed to link data on students to that of their teachers;
- constructed-response scoring reliability files providing data on the reliability of scoring for this type of item; and
- curriculum data files that contain the responses of countries or participating education systems to the curriculum questionnaires.

The following discussion focuses on the first three categories of files as these are the ones most likely to be used in data analyses by most users. For the remaining two categories of files, the reader is referred to the *TIMSS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013) or the *PIRLS 2011 User Guide for the International Database* (Foy & Drucker, 2013).

Data File Naming Convention for TIMSS/PIRLS

The file names of the data files consist of an eight-character string followed by a three-character file extension using the conventions listed below. These conventions are illustrated by reference to the SPSS file containing the fourth-grade school background data for the United States (ACGUSAM5.sav) and govern both TIMSS and PIRLS data file nomenclature.

The first character of the file name indicates grade level (ACGUSAM5).

- A – fourth grade
- B – eighth grade

The second character indicates the source or level of the information in the file (ACGUSAM5).

- C – school-level file
- T – teacher-level file
- S – student-level file

The third character indicates the type of data in the file (ACGUSAM5).

- A – student achievement items
- G – general background questionnaire items (school and student questionnaires), and the general teacher questionnaire for the fourth grade¹⁷
- M – mathematics teacher background questionnaire
- S – science teacher background questionnaire
- T – student-teacher linkage files

Characters four through six identify the education system using a three-character alphanumeric education system code based on the ISO coding scheme (ACGUSAM5). See exhibit 4-1 in Foy, Arora and Stanco (2013) for a list of the ISO codes for each participating education system in TIMSS and, for PIRLS, exhibit 4-1 in Foy and Drucker (2013).

The seventh and eighth characters indicate the study cycle (ACGUSAM5).

- M1 – TIMSS 1995 files
- M2 – TIMSS 1999 files
- M3 – TIMSS 2003 files
- M4 – TIMSS 2007 files
- M5 – TIMSS 2011 files
- R1 – PIRLS 2001 files
- R2 – PIRLS 2006 files
- R3 – PIRLS 2011 files

¹⁷Note that for PIRLS “A” “G” and “T” are the only characters used, as it is a single-subject assessment. To identify PIRLS files, the seventh and eighth characters must be considered.

The three-character file extensions used for the data files are as follows:

- .EXP – SAS export data
- .SAV – SPSS data

Exhibit 5-1 and 5-2 show the formats of the TIMSS 2011 and PIRLS 2011 data file names according to this scheme. For example, ASGUSAM5.SAV is an SPSS file that contains the U.S. TIMSS 2011 fourth-grade student background data, and BTSUSAM5.EXP is an SAS export file that contains the U.S. TIMSS 2011 eighth-grade science teacher background data. For each file type, a separate data file is provided for each participating education system. Data files are distinguished by the ISO code in positions four through six.

Exhibit 5-1. TIMSS data file names

File Names	Descriptions
ACG●●●M5	Fourth-grade school background data files
ASA●●●M5	Fourth-grade student achievement data files
ASG●●●M5	Fourth-grade student background data files
AST●●●M5	Fourth-grade student-teacher linkage files
ATG●●●M5	Fourth-grade teacher background data files
BCG●●●M5	Eighth-grade school background data files
BSA●●●M5	Eighth-grade student achievement data files
BSG●●●M5	Eighth-grade student background data files
BST●●●M5	Eighth-grade student-teacher linkage files
BTM●●●M5	Eighth-grade mathematics teacher background data files
BTS●●●M5	Eighth-grade science teacher background data files

●●● indicates three-character alphanumeric education system code (based on the ISO coding scheme) that is part of filename.

SOURCE: TIMSS 2011 User Guide for the International Database, exhibit 4-2, p. 81.

Exhibit 5-2. PIRLS data file names

File Names	Descriptions
ACG●●●R3	Fourth-grade school background data files
ASA●●●R3	Fourth-grade student achievement data files
ASG●●●R3	Fourth-grade student background data files
AST●●●R3	Fourth-grade student-teacher linkage files
ATG●●●R3	Fourth-grade teacher background data files

●●● indicates three-character alphanumeric education system code (based on the ISO coding scheme) that is as part of filename.

SOURCE: PIRLS 2011 User Guide for the International Database, exhibit 4-2, p. 81.

5.3 TIMSS and PIRLS Achievement Data Files and Variable Names

The data files containing the IRT-scaled achievement scores for overall mathematics and science, the several mathematics and science content domains, and the three mathematics and science cognitive domains are identified by the first three characters in the file name. A set of five plausible values characterizes each of these achievement scores.

Files beginning with ASA are fourth-grade achievement score files, and those beginning with BSA are eighth-grade achievement score files. For analytic convenience, these same achievement scores are also provided as an addition to the student background data files.

The achievement score variable names are based on an eight-character string defined below. In exhibit 5-3 these conventions are illustrated by reference to the first plausible value for each of the total, content domain, and cognitive domain achievement scales at each grade level.

First character of the variable name:

- A – fourth-grade score
- B – eighth-grade score

Second character of the variable name:

- S – indicates that this is a student score variable

Third character of the variable name:

- M – mathematics score
- S – science score
- R – reading score

Fourth through sixth characters of the variable name:

- Three-character code identifying the achievement scale, as indicated in exhibit 5-3 below.

Seventh and eighth characters of the variable name:

- 01 – first plausible value
- 02 – second plausible value
- 03 – third plausible value
- 04 – fourth plausible value
- 05 – fifth plausible value

For example, ASMMAT01 is the first plausible value for the fourth-grade mathematics total score. Again, ASSSCI02 is the second plausible value for the total science score, ASSEAR03 is the third plausible value for the content domain “Earth science,” and ASRLIT05 is the fifth plausible value for domain “Reading for Literacy Experience .”

Exhibit 5-3 shows the nomenclature for identifying the various total, content domain, and cognitive domain achievement scale score variables, each of which is represented by five plausible values.

TIMSS and PIRLS Benchmark Achievement Variables

The TIMSS and PIRLS achievement files also contain a set of variables indicating which international benchmark the students reached. For TIMSS, the overall mathematics and science scales at both grades have five plausible values for each of the four benchmark levels defined (advanced, high, intermediate, low). For PIRLS, a similar set of plausible values is provided for the overall reading scale. The international benchmark variables follow the achievement score variable naming convention but substitute the letters “IBM” in the fourth through sixth positions of the variable name. Thus, ASMIBM01, ASMIBM02, ASMIBM03, ASMIBM04, and ASMIBM05 are the five benchmark variables describing the fourth-grade overall mathematics score. Similarly, BSMIBM01 through BSMIBM05 describe the eighth-grade overall mathematics score and BSSIBM01 through BSSIBM05 describe the eighth-grade overall science score. Details for TIMSS are provided in Foy, Arora and Stanco (2013, pp. 86-87) and for PIRLS in Foy and Drucker (2013, pp. 86-87).

Exhibit 5-3. Three-digit codes identifying achievement scales in TIMSS and PIRLS

	Score Identifier	Examples of variable names	
		Grade 4	Grade 8
Mathematics overall score	MAT	ASMMAT01	BSMMAT01
Science overall score	SCI	ASSSCI01	BSSSCI01
Reading overall score	REA	ASRREA01	
Mathematics content domains			
Number	NUM	ASMNUM01	BSMNUM01
Geometric Shapes/Geometry	GEO	ASMGEO01	BSMGEO01
Data Display/Data and Chance	DAT	ASMDAT01	BSMDAT01
Algebra	ALG		BSMALG01
Science content domains			
Life Science	LIF	ASSLIF01	
Physical Science/Physics	PHY	ASSPHY01	BSSPHY01
Earth Science	EAR	ASSEAR01	BSSEAR01
Chemistry	CHE		BSSCHE01
Biology	BIO		BSSBIO01
Mathematics cognitive domains			
Knowing	KNO	ASMKNO01	BSMKNO01
Applying	APP	ASMAPP01	BSMAPP01
Reasoning	REA	ASMREA01	BSMREA01
Science cognitive domains			
Knowing	KNO	ASSKNO01	BSSKNO01
Applying	APP	ASSAPP01	BSSAPP01
Reasoning	REA	ASSREA01	BSSREA01
Purposes for Reading			
Reading for Literary Experience	LIT	ASRLIT01	
Reading to Acquire and Use Information	INF	ASRINF01	
Processes of Comprehension			
Retrieving and Straightforward			
Inferencing	RSI	ASRRSI01	
Interpreting, Integrating, and Evaluating	IIE	ASRIIE01	

SOURCE: Foy, P., Arora, A., and Stanco, G. (Eds.) (2013). *TIMSS 2011 User Guide for the International Database*. Chestnut Hill, MA: Boston College; Foy, P. and Drucker, K.T. (Eds.) (2013). *PIRLS 2011 User Guide for the International Database*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College

5.4 TIMSS and PIRLS Background Questionnaire Data Files

Student, teacher, and school files contain the responses to the questions contained in the respective background questionnaires administered in TIMSS 2011 or PIRLS 2011, along with a fourth file used to link the student and teacher background data appropriately when student and teacher files are merged.

TIMSS and PIRLS Student Background Data Files (ASG/BSG)

The student background data files contain students' responses to questions in the student questionnaire along with students' mathematics and science achievement scores (as plausible values). At the fourth grade, there was a single version of the student questionnaire for TIMSS and PIRLS. However, internationally there were two versions of the student questionnaire at the eighth grade: a version for education systems in which science is taught as an integrated subject (general science version), and another version for education systems in which the sciences (biology or life science, physics, chemistry, and Earth science) are taught separately. For eighth-grade students who were administered the general science version, as was the case for the United States and benchmarking U.S. states, questions that appeared only in the separate science version were coded as "not administered." For students in those education systems assigned the separate science versions, questions asked only in the general science version were coded as "not administered."

The student background data files also contain a number of identification variables, tracking variables, sampling and weighting variables, and derived variables that were used to produce some of the exhibits in the international reports.

TIMSS and PIRLS Teacher Background Data Files (ATG/BTM/BTS)

The mathematics and science teachers of the students sampled for TIMSS 2011 were administered at least one questionnaire for each TIMSS class taught. The teacher background data files contain one record for each of the classes taught. If teachers taught more than one class, they were expected to complete only one set of general background questions (part A), irrespective of the number of classes taught, and a separate part B (class-specific questions) for each class they taught.

Teachers of PIRLS classes were administered a single teacher background questionnaire that had questions about their background and their teaching practices in the classes of sampled students. Each

teacher was asked to complete a questionnaire for each class taught that contained sampled students. The PIRLS teacher background data files contain one record for each teacher and class combination.

Separate TIMSS teacher questionnaires were administered to eighth-grade mathematics and science teachers. The responses of teachers to the mathematics questionnaire are found in the BTM files, and the responses of teachers to the science questionnaire are in the BTS files. Variable names for questions repeated in both questionnaires are the same. Responses to the single questionnaire administered to fourth-grade teachers of TIMSS and PIRLS are found in the ATG files. The seventh and eighth characters (M5 or R3) discern between TIMSS and PIRLS teacher data files.

In all of the teacher files each teacher has a unique identification number (IDTEACH) and a link number (IDLINK) specific to the class taught by the teacher and to which the information in the data record corresponds. The IDTEACH and IDLINK combination uniquely identifies, within an education system, a teacher teaching a specific class. For example, students linked to teachers identified by the same IDTEACH but different IDLINK are taught by the same teacher but in different classes. It is important to note that the teachers in question do not constitute a representative sample of teachers in an education system but rather are the teachers who taught a representative sample of students. To reflect this fact, for the most part, the teacher data should be analyzed only in conjunction with the student-teacher linkage data files and weighted with student sampling weights.

TIMSS and PIRLS School Background Data Files (ACG/BCG)

The school background data files contain the responses of school principals to questions about school policy, resources, and environment asked in the school questionnaire. That file also contains a series of identification variables, link variables, and sampling variables. The school data files can be merged with the student data files by using the education system and school identification variables. Details of the merging procedure using the SPSS-linked IEA International Database (IDB) Analyzer or using SAS programs for TIMSS are described in the *TIMSS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013) and for PIRLS these details are provided in the *PIRLS 2011 User Guide for the International Database* (Foy & Drucker, 2013).

TIMSS and PIRLS Student-Teacher Linkage Data Files (AST/BST)

The TIMSS and PIRLS 2011 student-teacher linkage data files contain information required to link the student and teacher data files. These files contain one entry per student-teacher linkage combination in the data. For instance, if three teachers are linked to a student, there are three entries in the file corresponding to that student. The sole purpose of the student-teacher linkage data files is to link teacher-level data with student-level data to perform appropriate student-level analyses where teacher characteristics are disaggregated over students.

TIMSS and PIRLS Curriculum Questionnaire Data Files

In addition to the background questionnaires, TIMSS and PIRLS also provides data on the curriculum of the participating education systems. For TIMSS there is a separate file for each grade, while for PIRLS there is a single file.

5.5 Variable Naming Convention for Background Variables

The background variable naming convention is based on a seven- or eight-character string defined below. These conventions are illustrated by reference to an item in the fourth-grade school questionnaire. This item asks principals to report the population size of the community in which the school is located.

First character of the variable name (ACBG05A):

- A – fourth-grade
- B – eighth-grade

Second character of the variable name (ACBG05A):

- C – school principal
- T – teacher
- S – student

Third character of the variable name (ACBG05A):

- N – a national or nationally adapted background variable
- B – all background variables in the questionnaire data files
- D – all derived variables

Fourth character of the variable name¹⁸ (ACBG05A):

- G – general question (not subject specific)*
- R – question related to reading
- M – question related to mathematics
- S – question related to science
- B – question related to biology or life science
- C – question related to chemistry
- E – question related to earth science
- P – question related to physics of physical science

Fifth through eighth characters of the variable name (ACBG05A):

- Used to represent the sequential numbering of each question

For PIRLS, the curriculum questionnaire uses a different variable naming convention. The first three characters are “GEN” for general questions, or “REA” for questions relating to reading instruction. The remaining characters are defined by the sequential location of the questions in the questionnaire (Foy & Drucker, 2013).

Summary Indices and Derived Variables

The TIMSS and PIRLS questionnaires often devote several questions to a single construct. In these cases, responses to the individual items were combined to create a derived variable. A TIMSS or PIRLS index is a special type of derived variable that assigns students to one of three levels—high, medium, or low—on

¹⁸The letters “B,” “C,” “E,” and “P” are used only in the eighth-grade student background data files for variables corresponding to questions about separate sciences asked in the separate science version of the student questionnaire.

the basis of their responses to the component variables. These variables are described in detail in Supplement 3 of the *PIRLS 2011 User Guide for the International Database* (Foy & Drucker, 2013) and in Supplement 3 of the *TIMSS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013).

5.6 Sampling and Weighting Variables

Several sampling and weighting variables are included in the TIMSS and PIRLS data files. They are listed and described below in conjunction with a discussion of how and when these weights are used. Because TIMSS and PIRLS use a complex sampling design, sampling weights need to be used to generate accurate population estimates. The sampling weights account for the sample design, any stratification or disproportional sampling of subgroups, and also include adjustments for nonresponse (see Joncas & Foy, 2012).

As noted, the sample of students is not a simple random sample and, as a consequence, students in the sample do not have an equal probability of selection. Sampling weights adjust for this unequal probability and, in so doing, provide for statistical estimates reflective of the student population from which the sample was drawn. Sampling weights also include adjustments for school and student nonresponse. All TIMSS and PIRLS analyses require the application of sampling weights. Provisions for weighting data are a standard feature of virtually all software likely to be used in analyses.

The sampling weights included in the TIMSS and PIRLS 2011 data files are described in exhibit 5-4. (Note that teacher background data files do not have any sampling weight variables since the analysis of teacher variable requires the merging of the teacher data with the student data and the use of student sampling weight variables.)

Exhibit 5-4. TIMSS and PIRLS sampling weight variables

Variable Names	Descriptions
TOTWGT	Total student weight – sums to the national population
SENWGT	Student senate weight – sums to 500 in each education system
HOUWGT	Student house weight – sums to the student sample size in each education system
TCHWGT	Overall teacher weight
MATWGT	Mathematics teacher weight
SCIWGT	Science teacher weight
SCHWGT	School-level weight

SOURCE: Foy, P., Arora, A., and Stanco, G. (Eds.) (2013). *TIMSS 2011 User Guide for the International Database*. Chestnut Hill, MA: Boston College; Foy, P. and Drucker, K.T. (Eds.) (2013). *PIRLS 2011 User Guide for the International Database*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College

The characteristics of TIMSS and PIRLS sampling weight variables are as follows:

- TOTWGT sums to the student population size in each education system and is appropriate for “within-country”¹⁹ analyses and “cross-country” analyses where the analyses are conducted “country-by-country” and compared.
- SENWGT is a transformation of TOTWGT that results in a weighted student sample size of 500 in each education system. This weight may be appropriate for cross-“country” analyses that require each education system to have the same number of students rather than proportionately more students from larger education systems and fewer from smaller education systems, which is the case if TOTWGT is used.
- HOUWGT, another transformation of TOTWGT, ensures that the weighted sample corresponds to the actual sample size in each education system. This can be important since TOTWGT inflates sample sizes to approximate the population size, and software systems that use the actual sample size to compute significance tests will give misleading results under these conditions.
 - TOTWGT, SENWGT, and HOUWGT are designed for use in student-level analyses from all student-level files.
 - SCHWGT is designed for use in school-level analyses where the schools are the units of analysis.
 - TCHWGT, MATWGT, and SCIWGT are specifically designed for analyses that link teacher background data to student data.

¹⁹Although traditional terms with “country” are used throughout this discussion, they apply as well to all participating states and other education systems.

- TCHWGT is used for analyses using all teachers.
- MATWGT and SCIWGT are used for analyses of mathematics and science teachers, respectively.

5.7 Structure and Design Variables in TIMSS and PIRLS 2011 Data Files

The TIMSS and PIRLS 2011 data files also contain unique numerical identification variables for each respondent along with sample design information.

Identification Variables

In all TIMSS and PIRLS data files, identification variables are included to label countries, students, teachers, or schools. These variables also are used to link cases between the different data file types. The identification variables are the same across PIRLS and TIMSS, have the prefix “ID,” and are described below.

- IDCNTRY: a five-digit country identification code based on the ISO 3166 classification.
- IDPOP: identifies the target grade; “1” for the fourth grade and “2” for the eighth grade.
- IDGRADE: identifies the target grade of the participating students; “4” and “8” for most countries.
- IDSCHOOL: a four-digit identification code that uniquely identifies the participating schools within each country but are not unique across countries.
- IDCLASS: a six-digit identification code that uniquely identifies the sampled classrooms within a country.
- IDSTUD: an eight-digit identification code that uniquely identifies each sampled student in a country.
- IDBOOK: identifies the specific assessment booklet that was administered to each student.
- IDSTRATE & IDSTRATI: identification variables generated by the school sampling process. IDSTRATE identifies the explicit strata and IDSTRATI the implicit strata from which the participating schools were sampled.

- IDTEACH: a six-digit identification code that uniquely identifies a teacher within a school.
- IDLINK: uniquely identifies the class for which a teacher answered a questionnaire.

Tracking Variables

Information about students, teachers, and schools provided by the survey tracking forms described earlier is stored in the tracking variables. These variables have the prefix “IT.” All tracking variables are included in the student background data files. ITLANG is included in the student achievement and student background data files.

- ITSEX: Gender of each student as stated in the Student Tracking Form.
- ITBIRTHM and ITBIRTHY: month and year of birth of each student as stated in the Student Tracking Forms.
- ITDATEM and ITDATEY: month and year of testing for each student.
- ITLANG: language of testing for each student.

5.8 TIMSS and PIRLS 2011 Codebook Files

All information related to the structure of the TIMSS and PIRLS 2011 data files, as well as the source, format, descriptive labels, and response option codes for all variables, is contained in codebook files. Each data file type in the database is accompanied by a codebook file, with the exception of the curriculum data files. These files are available from the TIMSS and PIRLS International Study Center website at <http://timssandpirls.bc.edu/timss2011/international-database.html>.

5.9 The U.S. National and State Benchmarking Data Files

The instrumentation for the U.S. national and state samples are identical because states were administered the U.S. national instruments. As noted earlier, the U.S. national instrumentation differs from the international instrumentation in five ways:

- Minor language/expression adaptations were made to some of the instructions.
- Minor language adaptations were made to the wording of some assessment items.

- For a few questionnaire items, response alternatives were changed but in a way that allowed a crosswalk to the international response alternatives.
- One international question was not asked in the United States because of its sensitivity.
- Several U.S.-specific questions without international counterparts were added to the student and school questionnaires.

Otherwise, the U.S. instrumentation is exactly the same as the international instrumentation. This will become apparent in comparisons between U.S. and international questionnaires. For standard international versions of TIMSS and PIRLS 2011 questionnaires, please see Supplement 1 of either TIMSS or PIRLS User Guide for the International Database. TIMSS and PIRLS provide parallel supplements to the International User Guides.

For TIMSS, the supplements to the international user guide are as follows:

- Supplement 1, International Version of the TIMSS 2011 Background and Curriculum Questionnaire, can be downloaded from the TIMSS and PIRLS International Study Center at http://timssandpirls.bc.edu/timss2011/downloads/T11_UG_Supplement1.pdf.
- Supplement 2 for TIMSS can be downloaded from the TIMSS and PIRLS International Study Center at http://timssandpirls.bc.edu/timss2011/downloads/T11_UG_Supplement2.pdf.
- Supplement 3, the TIMSS Variables Derived from the Student, Home, Teacher, and School Questionnaire Data of the TIMSS 2011 User Guide for the International Database can be downloaded from the TIMSS and PIRLS International Study Center at http://timssandpirls.bc.edu/timss2011/downloads/T11_UG_Supplement3.pdf.
- The U.S. versions of the TIMSS questionnaires can be found at <http://nces.ed.gov/timss/questionnaire.asp>. The variable names in the U.S. files are identical to those in the international files with the exception of the U.S.-specific variables added.

The PIRLS supplements to the PIRLS International User Guide are as follows:

- Supplement 1, International Version of the PIRLS 2011 Background Questionnaires and Curriculum Questionnaire, can be downloaded from the TIMSS and PIRLS International Study Center at http://timssandpirls.bc.edu/pirls2011/downloads/P11_UG_Supplement1.pdf.
- Supplement 2, like TIMSS, the PIRLS National Adaptations of International Background Questionnaires of the PIRLS 2011 User Guide for the International Database can be downloaded from the TIMSS and PIRLS International Study Center at http://timssandpirls.bc.edu/pirls2011/downloads/P11_UG_Supplement2.pdf.

- Supplement 3, the PIRLS Variables Derived from the Student, Home, Teacher, and School Questionnaire Data of the PIRLS 2011 User Guide for the International Database can be downloaded from the TIMSS and PIRLS International Study Center at http://timssandpirls.bc.edu/pirls2011/downloads/P11_UG_Supplement3.pdf.
- The PIRLS questionnaires may be downloaded from <http://nces.ed.gov/surveys/pirls/questionnaire.asp>. The variable names in the U.S. files are identical to those in the international files with the exception of the U.S.-specific variables added.

Background Questionnaire Items With U.S. Adaptations to Response Alternatives

As the description of U.S. national adaptations in appendix F makes clear, there were a number of relatively minor changes to the wording of the international item stems and response alternatives in the questionnaires. Most of these adaptations do not require comment, as they are identical in format between the international and U.S. versions of the questionnaires (for example, they contain simple wording changes). In some cases, however, the adaptations resulted in item response formats not immediately comparable between the international and national versions of the questionnaires. As indicated in appendix F, there are instances in which the international and U.S. versions of variables have different sets of response codes; “highest level of formal education” in the teacher questionnaire is one example. This means that, for these items, the data will not be identical in international and U.S. versions of the data files. Using the same example, “highest level of formal education” will have six response categories in the U.S. international file and seven categories in the U.S. national file.²⁰ However, as indicated in appendix F crosswalks between international and U.S. versions of these questions allow for the conversion of the U.S. response codes to the international format.

U.S.-Specific Variables

U.S.-specific items were added to the student, teacher, and school questionnaires. Six questions were added to the **student questionnaires**:

1. a two-part question designed to measure the student’s race/ethnicity;
2. a question that asked for language other than English spoken at home;

²⁰The paper version of teacher questionnaire had 8 categories for this question, but was recoded to 7 categories to match the on-line version. This was recoded to 6 categories to match the international version of this question.

3. a 3-part question asking about place of birth and parents place of birth;
4. a question about additional activities outside of school;
5. a question asking about number of days absent; and
6. a two-part question that asked students to indicate whether they had repeated a grade in elementary and/or middle/junior high school (grade 8 student questionnaire only).

One question was added to the grade 8 **teacher questionnaires** that asked teachers to identify the title of the mathematics or science course being taught to the students being assessed. Three questions were added to the **school questionnaire**:

1. the percentage of students in the school eligible for free or reduced-price lunch;
2. the percentage of students in the school who are English language learners; and
3. a specification of the type of school.

Race/Ethnicity (TIMSS 4 & 8/PIRLS Student Questionnaire)

Students' race/ethnicity was obtained through student responses to a two-part question in the student questionnaire. Students were asked first whether they were Hispanic or Latino and then whether they were members of the following five racial groups: (1) American Indian or Alaska Native; (2) Asian; (3) Black or African American; (4) Native Hawaiian or other Pacific Islander; or (5) White. Multiple responses to the second of these questions were allowed.²¹ A composite variable with six categories was constructed in which results are shown separately for (1) Hispanics of any race; (2) Blacks; (3) Whites; (4) Asians; and (5) Multiracial. The sixth category was labeled as "Other" and consisted of the small numbers of students indicating that they were American Indian, Alaska Native, Native Hawaiian, or other Pacific Islander.²²

²¹Race-ethnicity is provided with all categories in the restricted-use data set .

²²Race-ethnicity is provided as a composite variable in the public-use data set. The state benchmarking restricted-use datasets contain both the categorical and composite forms of the variable.

Language Other Than English Spoken at Home (TIMSS 4 & 8/PIRLS Student Questionnaire)

This item extended the international question about how often students spoke English at home to ask those who indicated that they did not always speak English if they spoke Spanish or another language.²³

Repeating a Grade (TIMSS 8 Student Questionnaire)

Students were asked whether they had ever repeated a grade in either “elementary school” and/or “middle or junior high school.” The response alternatives were “yes” or “no” in each case.

Additional Outside Activities (TIMSS 4/PIRLS Student Questionnaire)

The measure of outside of school activities was collected using a prompt with 4 yes/no questions. The prompt states, “The following questions ask about the activities you do outside of school. The yes/no questions were as follows:

- Do you play on a sports team outside of school?
- Do you play a musical instrument outside of school?
- Are you studying something in a class outside of school?
- Do you belong to a club outside of school (like Girl Scouts, Cub scouts, 4-H, or Boys and Girls Club)?

Number of Days Absent (TIMSS 4 & 8/PIRLS Student Questionnaire)

TIMSS and PIRLS students were asked about their school attendance over the last month prior to the assessment. The students were asked to select one response option. The question and response options were as follows:

²³At grade 4 and 8, students who responded to items ASBG03N (grade 4) and BSBG03 (grade 8) that they “always” speak English at home were supposed to skip items ASNG03B (grade 4) and BSNG03B (grade 8), which asks students to identify the foreign language that they sometimes use at home. However, about 10 percent of students (1267 cases) at grade 4, and 5 percent of students (565 cases) at grade 8 responded that they “always” speak English at home and also identified a foreign language that they sometimes use at home.

How many days were you absent from school in the last month?

- None;
- 1 or 2 days;
- 3 or 4 days;
- 5 to 10 days; or
- More than 10 days.

Country of Mother/Father/Student (TIMSS 4/PIRLS Student Questionnaire)

Grade 4 students, in both TIMSS and PIRLS, were asked about the location of their birth and about the location of their parents or legal guardians birth using three yes/no questions. These questions were as follows:

- A. Was your mother (or stepmother or female legal guardian) born in the United States? (“United States” includes the 50 states, its territories, the District of Columbia, and U.S. military bases abroad.)
- B. Was your father (or stepfather or male legal guardian) born in the United States?
- C. Were you born in the United States?

Mathematics Course Taught (TIMSS 8 Teacher Questionnaire)

Eighth-grade mathematics teachers were asked about the nature of the mathematics course they taught to the TIMSS students. The response alternatives provided were as follows:

- Basic or general eighth-grade math (not algebra or pre-algebra);
- Introduction to algebra or pre-algebra;
- Two-year pre-algebra;
- Algebra I (1-year course);
- Algebra I (first year of a 2-year algebra I course);
- Algebra I (second year of a 2-year algebra I course);

- Geometry;
- Algebra II;
- Integrated or sequential math; and
- Other math class.

Science Course Taught (TIMSS 8 Teacher Questionnaire)

Eighth-grade science teachers were asked about the nature of the science course they taught to the TIMSS students. The response alternatives provided were as follows:

- General science (several content areas of science taught separately);
- Integrated science (several content areas of science taught combined and taught throughout the year);
- Life science (e.g., biology, ecosystems, human health);
- Physical science (e.g., physics or chemistry); and
- Earth science (e.g., geology, earth and the solar system, fossils).

Poverty Level in Public Schools (Percentage of Students Eligible for Free or Reduced-Price Lunch) (TIMSS 4 & 8/PIRLS School Questionnaire)

The measure of poverty level in public schools was obtained from principals' responses to the school questionnaire. The question asked the principal to report, as of approximately October 2010, the percentage of students at the school eligible to receive free or reduced-price lunch through the National School Lunch Program. Responses were grouped into five categories: (1) less than 10 percent, (2) 10 to 24.9 percent, (3) 25 to 49.9 percent, (4) 50 to 74.9 percent, and (5) 75 percent or more.²⁴ Missing data on this variable were replaced with measures taken from the Common Core of Data. The effect of this replacement on the confidentiality of the data was examined as part of the confidentiality analyses described earlier.

²⁴Free or reduced-price lunch is provided as a composite variable in the public-use data set, and as a continuous variable in the restricted-use dataset. State benchmarking restricted-use datasets contain both the categorical and composite forms of the variable.

Limited-English Proficient (LEP)/English Language Learners (ELL) (TIMSS 4 & 8/PIRLS School Questionnaire)

Principals were asked to report the percentage of such students and were provided with the following 8 response categories: 0 percent; 1–5 percent; 6–10 percent; 11–25 percent; 26–50 percent; 51–75 percent; 76–90 percent; and over 90 percent.

Type of School (TIMSS 4 & 8/PIRLS School Questionnaire)

Principals were asked to identify their schools using one of the following 10 response categories: (1) regular public school; (2) regular public school with magnet program; (3) magnet school or school with special program; (4) special education; (5) alternative curriculum; (6) vocational; (7) charter school; (8) independent private school; (9) religiously affiliated private school; or (10) other school.

Missing Data

Data derived from the student, school and teacher questionnaires and from the student assessments contain missing data in varying amounts. Four sources of missing data are identified:

1. Not administered. The respondent was not administered the actual item. He or she had no chance to read and answer the question.
2. Omitted. The respondent had a chance to answer the question but did not do so. This code also was used for responses that were not interpretable.
3. Logically not applicable. The respondent answered a preceding filter question in a way that made the following dependent questions not applicable to him or her.
4. Not reached (only used in the achievement files). This code indicates those items not reached by the students due to a lack of time.

SAS and SPSS control code for all the data files include the code for handling/converting missing data.

Imputation

No imputation for missing values was undertaken. However, missing data on the measure of school poverty (proportion of students eligible for free or reduced-price lunch) reported by schools was replaced as described above.

5.10 Data Files Available From the Website of the National Center for Education Statistics

The data files containing the U.S. national data for TIMSS can be downloaded from the NCES website at <http://nces.ed.gov/timss/datafiles.asp>. The data files containing the U.S. national data for PIRLS can be downloaded from the NCES website at <http://nces.ed.gov/surveys/pirls/datafiles.asp>. These national files are in ASCII format and are named as indicated in exhibit 5-5. SAS and SPSS codes for reading these data files can also be downloaded from the NCES website.²⁵

Exhibit 5-5. U.S. national data file names

Contents	File name
Grade 4 TIMSS	
Student Background	T4_STUDENT11.DAT
Student Achievement	T4_ACHIEVE11.DAT
Teacher Background	T4_TEACHER11.DAT
Student-Teacher Link	T4_STD_TCH_LINK11.DAT
School Background	T4_SCHOOL11.DAT
Grade 4 PIRLS	
Student Background	P4_STUDENT11.DAT
Student Achievement	P4_ACHIEVE11.DAT
Teacher Background	P4_TEACHER11.DAT
Student-Teacher Link	P4_STD_TCH_LINK11.DAT
School Background	P4_SCHOOL11.DAT
Grade 8 TIMSS	
Student Background	T8_STUDENT11.DAT
Student Achievement	T8_ACHIEVE11.DAT
Math Teacher Background	T8_MTEACHER11.DAT
Science Teacher Background	T8_STEACHER11.DAT
Student-Teacher Link	T8_STD_TCH_LINK11.DAT
School Background	T8_SCHOOL11.DAT

SOURCE: National Center for Education Statistics, U.S. Department of Education (2013).

²⁵The public-use data set and restricted-use data CD contain a quick guide that explains how to use ASCII files with syntax files to create SPSS or SAS datasets.

5.11 Merging TIMSS/PIRLS 2011 Data Files

In preparing TIMSS 2011 or PIRLS 2011 data for analysis it may be necessary to merge two (or more) of the data files named in exhibit 5-5. Not every analysis will require merging of files, however. For example, analyses looking at the relationship between student background and achievement can be done using the student background file alone. However, analyses that wish to examine the relationships between school and/or teacher and/or student characteristics and student achievement will require that files be merged. Standard merging procedures as implemented in SPSS, SAS or Stata can be applied. Examples are provided below along with illustrative SAS and SPSS code. (These various merges are facilitated for SPSS users who choose to work with the IEA International Database Analyzer [IEA IDB Analyzer] described below.)

The merging procedures illustrated below follow the same pattern as previous TIMSS studies (see Foy et al., 2013) and are illustrated with TIMSS Grade 8 data. The user will need to replace file names in order to run the merges for TIMSS Grade 4 or PIRLS.

Merging Student and School Data

If the intent is to disaggregate school data across students the school-level data are merged to the student file using IDSCHOOL. The disaggregated data can be analyzed at the student level using the student-level weight TOTWGT. Exhibits 5-6 and 5-7 provide examples of how to merge the student and school data using SAS and SPSS. Additional examples are provided in chapters 2 and 3 in the *TIMSS 2011 User Guide for the International Database* (Foy et al., 2013; available at <http://timssandpirls.bc.edu/timss2011/international-database.html>) and PIRLS 2011 User Guide for the International Database (Foy et. al., 2013; available at <http://timssandpirls.bc.edu/pirls2011/international-database.html>).

Exhibit 5-6. Illustrative SAS code for merging U.S. TIMSS eighth-grade student and school data

```
libname bM5 "C:\TIMSS2011\Data";
data SCHOOL;
set bM5.T8_SCHOOL11;
proc sort data= SCHOOL;
by IDSCHOOL;
data STUDENT;
set bM5.T8_STUDENT11;
proc sort data= STUDENT;
by IDSCHOOL;
data bM5.MERGE1;
merge STUDENT SCHOOL;
by IDSCHOOL;
run;
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

This example creates a temporary SAS dataset (SCHOOL) using the permanent school dataset bM5.T8_SCHOOL11. It then sorts the school data by school ID (IDSCHOOL). A similar procedure is used for the student file (STUDENT), which is also sorted by the school ID using the permanent student dataset bM5.T8_STUDENT11. The final dataset is a permanent dataset called bM5.MERGE1 containing the merged file from SCHOOL and STUDENT using IDSCHOOL as the merge variable.

The SPSS example shown in exhibit 5-7 works in a similar way. SPSS uses a file containing the school variables (T8_SCHOOL11.SAV) and sorts the cases by IDSCHOOL. The same procedure is used for the student dataset, T8_STUDENT11.SAV. The “match files” command merges the two files, and the final, merged output file is saved as MERGE1.SAV.

Exhibit 5-7. Illustrative SPSS code for merging U.S. TIMSS eighth-grade student and school data

```
get file = "C:\TIMSS2011\Data\T8_SCHOOL11.SAV".
sort cases by IDSCHOOL.
save outfile = 'C:\TIMSS2011\Data\SCHOOL.SAV'.
get file = "C:\TIMSS2011\Data\T8_STUDENT11.SAV".
sort cases by IDSCHOOL.
save outfile = 'C:\TIMSS2011\Data\STUDENT.SAV'.
match files
/ file= 'C:\TIMSS2011\Data\STUDENT.SAV'
/ table= 'C:\TIMSS2011\Data\SCHOOL.SAV'
/ by IDSCHOOL.
save outfile = "C:\TIMSS2011\Data\MERGE1.SAV".
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Merging Student and Teacher Data

In the United States, the student sample was based on intact classrooms. The teachers of the students selected in this way are not a sample of teachers and should be seen as the “teachers of the sampled students.” To maintain this linkage merges of teacher and student data must use the student-teacher link file (T8_STD_TCH_LINK11.DAT) which also contains the appropriate teacher sampling weights. Exhibits 5-8 and 5-9 provide illustrative code for merging the student and the mathematics teacher files in SAS and SPSS. The sample code provided illustrates the merge involving the eighth-grade mathematics teacher file with student file. The same logic applies to a merge involving the science teacher file (T8_STEACHER11.DAT). Additional examples of how to merge the student and teacher files using SAS and SPSS are provided in chapters 2 and 3 of the *TIMSS 2011 User Guide for the International Database* (Foy et al., 2013; available at <http://timssandpirls.bc.edu/timss2011/international-database.html>) and *PIRLS 2011 User Guide for the International Database* (Foy et al., 2013; available at <http://timssandpirls.bc.edu/pirls2011/international-database.html>).

Exhibit 5-8. Illustrative SAS code for merging U.S. TIMSS eighth-grade student and mathematics teacher data

```
Libname bM5 "C:\TIMSS2011\Data";
data TEACHER;
set bM5.T8_MTEACHER11;
proc sort data= TEACHER;
by IDTEACH IDLINK;
data STDTC;
set bM5.T8_STD_TCH_LNK11;
proc sort data= STDTC;
by IDTEACH IDLINK;
data TEACHMRG;
merge TEACHER STDTC;
by IDTEACH IDLINK;
if MATWGT > 0;
proc sort data = TEACHMRG;
by IDSTUD;
data STUDENT;
set bM5.T8_STUDENT11;
proc sort data = STUDENT;
by IDSTUD;
data bM5.MERGE2;
merge STUDENT TEACHMRG;
by IDSTUD;
run;
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

In the SAS example, the program creates a temporary SAS dataset (TEACHER) using the permanent mathematics teacher file, bM5.T8_MTEACHER11. It then sorts the teacher data by the teacher ID (IDTEACH) and the link ID (IDLINK). A similar procedure is used for the student-teacher link file (STDTCH), using the permanent file (bM5.T8_STD_TCH_LINK11) which is also sorted by the teacher ID and the link ID. The weight variable for mathematics teachers (MATWGT) is used as a selection variable because mathematics teachers have been selected. The result is a merged file called bM5.TEACHMRG with disaggregated teacher data. This file is merged with the student file (STUDENT). The final dataset is a permanent dataset called bM5.MERGE2 that contains the merged file from TEACHMRG and STUDENT using IDSTUD as the merge variable.

The SPSS student-teacher merge in Exhibit 5-9 uses a file containing the teacher variables (T8_MTEACHER11.SAV) and sorts the cases by IDTEACH and IDLINK. The file is then saved as TEACHER. The same procedure is used for the student-teacher linkage dataset T8_STD_TCH_LINK11.SAV. The “match files” command merges the two files by the ID variables IDTEACH and IDLINK, and the merged output file is saved as TEACHMRG. To include the student data, the student file is selected (T8_STUDENT11.SAV), sorted by IDSTUD and saved as STUDENT. This file is merged with TEACHMRG using IDSTUD to create the final file MERGE2.SAV containing both teacher and student variables.

Exhibit 5-9. Illustrative SPSS code for merging U.S. TIMSS eighth-grade student and mathematics teacher data

```
get file = "C:\TIMSS2011\Data\T8_MTEACHER11.SAV".
sort cases by IDTEACH IDLINK .
save outfile = 'C:\TIMSS2011\Data\TEACHER.SAV'..
get file = "C:\TIMSS2011\Data\T8_STD_TCH_LNK11.SAV".
select if MATWGT > 0.
sort cases by IDTEACH IDLINK.
save outfile= 'C:\TIMSS2011\Data\STDTCH.SAV'.match files
/ file='C:\TIMSS2011\Data\STDTCH.SAV'
/ table='C:\TIMSS2011\Data\TEACHER.SAV'
/ by IDTEACH IDLINK.
sort cases by IDSTUD.
save outfile = 'C:\TIMSS2011\Data\TEACHMRG.SAV'..
get file = "C:\TIMSS2011\Data\T8_STUDENT11.SAV".
sort cases by IDSTUD.
save outfile= 'C:\TIMSS2011\Data\STUDENT.SAV'.
match files
/ file= 'C:\TIMSS2011\Data\TEACHMRG.SAV'
/ table= 'C:\TIMSS2011\Data\STUDENT.SAV'
/ by IDSTUD.
save outfile = "C:\TIMSS2011\Data\MERGE2.SAV".
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Merging Student, School, and Teacher Data

In merging student, teacher, and school data together to form a single dataset, the procedures from sections 5.11.1 and 5.11.2 are combined. Exhibits 5-10 and 5-11 show illustrative SAS and SPSS code designed to achieve this three-way merge. As in the previous examples, the sample code is based on eighth-grade mathematics teacher file. A merge involving the eighth-grade science teacher file follows the same logic.

This example uses the same merging steps as with the previous school and teacher examples (MERGE1 and MERGE2), then merges the output files by the student id, IDSTUD, into a final file bM5.MERGEALL containing linked student, school, and teacher data at the student level.

Exhibit 5-10. Illustrative SAS code for merging U.S. TIMSS eighth-grade school, mathematics teacher and student data

```
libname bM5 "C:\TIMSS2011\Data";
data SCHOOL;
set bM5.T8_SCHOOL11;
proc sort data= SCHOOL;
by IDSCHOOL;
data STUDENT;
set bM5.T8_STUDENT11;
proc sort data= STUDENT;
by IDSCHOOL;
data MERGE1 ;
merge STUDENT SCHOOL;
by IDSCHOOL;
proc sort data=MERGE1;
by IDSTUD;
data TEACHER ;
set bM5.T8_MTEACHER11;
proc sort data= TEACHER;
by IDTEACH IDLINK ;
data STDTCCH ;
set bM5.T8_STD_TCH_LNK11;
proc sort data= STDTCCH;
by IDTEACH IDLINK;
data MERGE2;
merge STDTCCH TEACHER;
by IDTEACH IDLINK;
if MATWGT > 0;
proc sort data = MERGE2;
by IDSTUD;
data bM5.MERGEALL;
merge MERGE1 MERGE2;
by IDSTUD;
run;
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

In the SPSS example shown in exhibit 5-11 the student and school data are first sorted by IDSCHOOL and then merged. The procedure followed for combining student and teacher data in Exhibit 5-9 is used again. Then the saved student-school and student-teacher files are merged by IDSTUD, and a final dataset MERGEALL.SAV is saved.

Exhibit 5-11. Illustrative SPSS code for merging U.S. TIMSS eighth-grade school, mathematics teacher and student data

```

get file = "C:\TIMSS2011\Data\T8_SCHOOL11.SAV".
sort cases by IDSCHOOL.
save outfile = 'C:\TIMSS2011\Data\SCHOOL.SAV'.
get file = "C:\TIMSS2011\Data\T8_STUDENT11.SAV".
sort cases by IDSCHOOL.
save outfile = 'C:\TIMSS2011\Data\STUDENT.SAV'.
match files
/ file= 'C:\TIMSS2011\Data\STUDENT.SAV'
/ table= 'C:\TIMSS2011\Data\SCHOOL.SAV'
/ by IDSCHOOL.
save outfile = "C:\TIMSS2011\Data\MERGE1.SAV" .
get file = "C:\TIMSS2011\Data\T8_MTEACHER11.SAV".
sort cases by IDTEACH IDLINK .
save outfile = 'C:\TIMSS2011\Data\TEACHER.SAV'.
get file = "C:\TIMSS2011\Data\T8_STD_TCH_LNK11 .SAV".
select if MATWGT > 0 .
sort cases by IDTEACH IDLINK.
save outfile = 'C:\TIMSS2011\Data\STDTCCH.SAV'.
match files
/ file= 'C:\TIMSS2011\Data\STDTCCH.SAV'
/ table= 'C:\TIMSS2011\Data\TEACHER.SAV'
/ by IDTEACH IDLINK.
save outfile = "C:\TIMSS2011\Data\MERGE2.SAV".
Get file = "C:\TIMSS2011\Data\MERGE1.SAV".
Sort cases by IDSTUD.
save outfile = 'C:\TIMSS2011\Data\MERGE1.SAV'.Get file =
"C:\TIMSS2011\Data\MERGE2.SAV".
Sort cases by IDSTUD.
save outfile = 'C:\TIMSS2011\Data\MERGE2'.match files
/ file= 'C:\TIMSS2011\Data\MERGE2.SAV'
/ table= 'C:\TIMSS2011\Data\MERGE1.SAV'
/ by IDSTUD.
save outfile = "C:\TIMSS2011\Data\MERGEALL.SAV".

```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Merging TIMSS or PIRLS 2011 Data With Restricted-Use Data

Users who have been granted a license to use the restricted-use TIMSS or PIRLS 2011 data will receive a restricted-use CD-ROM which contains an additional link file that provides a way to merge TIMSS or PIRLS data with school data from the Common Core of Data (CCD) and the Private School Survey (PSS). The NCESSCH (the NCES unique public school identification code) from the TIMSS or PIRLS file is used to merge with NCESSCH from the CCD file. The PPIN (the private school's unique identification number) from the TIMSS or PIRLS file is used to merge with the PPIN from the PSS file. Illustrative SAS and SPSS code is provided in Exhibits 5-12 and 5-13.

The code in question provides for a link between the TIMSS school data and the CCD/PSS data by school. Further merging to other TIMSS files (student, school, teacher) can be conducted using the IDSCHOOL for merging as has been shown in earlier examples.

Exhibit 5-12. Illustrative SAS code for merging U.S. TIMSS eighth-grade school data with restricted-use (CCD and PSS) data

```
libname bm5 "C:\TIMSS2011\Data" ;
data SCHOOL ;
set bm5.T8_RESTRICTED_USE11;
proc sort data= SCHOOL;
by NCESSCH ;
data CCD ;
set bm5.CCD;
proc sort data= CCD;
by NCESSCH;
data MERGE1 ;
merge CCD(IN=IN1) SCHOOL (IN=IN2);
by NCESSCH;
IF IN2;
run;

/* User can Merge in PSS data to the file containing CCD and TIMSS previously merged
data */

Data SCHOOL2;
Set MERGE1;
proc sort data= SCHOOL2;
by PPIN ;
data PSS ;
set bm5.PSS;
proc sort data= PSS;
by PPIN;
data MERGE2 ;
merge PSS(IN=IN1) SCHOOL2 (IN=IN2);
by PPIN;
IF IN2;
run;
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

SPSS code designed to provide this same link between the TIMSS school data and the CCD/PSS data by school is provided in exhibit 5-13. Further merging to other TIMSS files (student, school, teacher) can be conducted using the IDSCHOOL for merging as has been shown in earlier examples.

Exhibit 5-13. Illustrative SPSS code for merging U.S. TIMSS eighth-grade school data with restricted (CCD and PSS) data

```
get file = "C:\TIMSS2011\Data\T8_RESTRICTED_USE11.SAV".
sort cases by NCESSCH.
save outfile = 'C:\TIMSS2011\Data\SCHOOL.SAV'.get file =
"C:\TIMSS2011\Data\CCD.SAV".
sort cases by NCESSCH.
save outfile = 'C:\TIMSS2011\Data\CCD.SAV'.
match files
/ file= 'C:\TIMSS2011\Data\CCD.SAV'
/ table= 'C:\TIMSS2011\Data\SCHOOL.SAV'
/ by NCESSCH.
save outfile = "C:\TIMSS2011\Data\MERGE1.SAV".
```

* Merge PSS to the Combined TIMSS/CCD school-level file

```
get file = "C:\TIMSS2011\Data\MERGE1.SAV".
sort cases by PPIN.
save outfile = 'C:\TIMSS2011\Data\SCHOOL2.SAV'.
get file = "C:\TIMSS2011\Data\PSS.SAV".
sort cases by PPIN.
save outfile = 'C:\TIMSS2011\Data\PSS.SAV'.
match files
/ file= 'C:\TIMSS2011\Data\PSS.SAV'
/ table= 'C:\TIMSS2011\Data\SCHOOL2.SAV'
/ by PPIN.
save outfile = "C:\TIMSS2011\Data\MERGE2.SAV" .
```

SOURCE: International Association for the Evaluation of Education Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

5.12 Some Notes on Analyzing the TIMSS and PIRLS 2011 Data

The design of TIMSS and PIRLS raises three special considerations for the analysis of TIMSS and PIRLS data. First, the assessment design necessitates the use of five *plausible values* rather than a single score for each of the various measures of mathematics, science, and reading achievement. Second, since the sampling design is not a simple random sample in which each student had an equal probability of selection, *sampling weights* need to be applied to generate unbiased estimates of population parameters. Third, the complex sampling design also means that the calculation of the *standard errors* of the various statistics generated requires special procedures.

Plausible Values

As noted earlier, the assessment design was based on Balanced Incomplete Block (BIB) spiraling of assessment items to increase content-area coverage without a concomitant increase in the assessment time demanded of students. Each student completed only a subset of the total pool of assessment items, with the resulting data containing missing values for other items in the pool but not in the subset administered to the student. The trade-off for increased coverage through BIB spiraling is increased measurement error in the scores available for each student. This is accommodated through the estimation of (five) plausible values for each student rather than a single (unreliable) point estimate. Plausible values are random draws from the estimated distribution of a student's achievement. A detailed description of the TIMSS or PIRLS 2011 scaling can be found in *Methods and Procedures in TIMSS and PIRLS 2011* (Martin & Mullis, 2011).

What this means for those analyses of TIMSS and PIRLS data that include achievement measures is that the analyses need to be done five times and the results averaged. For example, if one was regressing mathematics achievement on a number of family and school attributes, it would be necessary to estimate this equation five times and then average each set of five parameter estimates. It would not be legitimate to take the mean of the five plausible values in the first instance and then regress this mean on a number of family and school attributes.

Estimating Sampling Variance

The complex sampling design used in TIMSS and PIRLS 2011 complicates the task of computing standard errors. Most standard analysis software systems such as SAS and SPSS provide estimates based on the assumption of a simple random sample. Given the TIMSS and PIRLS sampling design, such standard errors will underestimate the true standard errors. TIMSS and PIRLS adopt the jackknife repeated replication (JRR) technique because it is computationally straightforward and provides approximately unbiased estimates of the sampling errors of means, totals, and percentages. The variables necessary for these JRR procedures are included as part of the TIMSS and PIRLS 2011 data files: JKZONE, the sampling zone (stratum) of the student's school; and JKREP, the sampling replicate (primary sampling unit) of the student's school.

There are, however, several options for estimating sampling errors that avoid the assumption of simple random sampling. The SPSS-linked *International Database (IDB) Analyzer* software was designed specifically by International Association for the Evaluation of Educational Achievement (IEA) for

analyzing TIMSS and PIRLS international data files. This software is freely available from the IEA website at <http://www.iea.nl/data.html>.

Special-use software is also available for estimating the standard errors of statistics generated from complex sampling designs. Among the packages available are *AM*, available from the American Institutes for Research at <http://am.air.org/about2.asp>; *WesVar*, available from Westat at http://www.westat.com/Westat/expertise/information_systems/WesVar/wesvar_downloads.cfm; and *SUDAAN*, available from Research Triangle Institute at <http://www.rti.org/sudaan>. Some software packages provide for these capabilities as well.

In addition, SAS macros suitable for this purpose are available as part of the *TIMSS 2011 User Guide for the International Database*, as well as in the *PIRLS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013; Foy & Drucker, 2013). See also work by Stapleton (2006, 2008), which suggests procedures that can be used to generate appropriate standard errors for statistics generated by structural equation modeling techniques.

The IEA International Database (IDB) Analyzer and International Data Explorer (IDE)

As described in section 5.12.2, the IDB Analyzer was developed by the IEA Data Processing and Research Center (IEA DPC) as a plug-in for SPSS and can only be used in conjunction with SPSS. It is not a stand-alone analysis system.

The IDB Analyzer enables users to combine SPSS data files and conduct analyses using SPSS without actually writing programming code. The IDB Analyzer generates SPSS syntax that takes into account information from the sampling design in the computation of statistics and their standard errors. In addition, the generated SPSS syntax makes appropriate use of plausible values for calculating estimates of achievement scores and their standard errors, combining both sampling variance and imputation variance.

The IDB Analyzer consists of two modules—a merge module and an analysis module. The *merge module* is used to create analysis datasets by combining data files of different types and from different countries and selecting subsets of variables for analysis. The *analysis module* provides procedures for computing various statistics and their standard errors. All statistical procedures offered within the analysis module of the IDB Analyzer make appropriate use of sampling weights, and standard errors are computed using the jackknife repeated replication (JRR) method. Percentages, means, regressions, and correlations may be

specified with or without achievement scores. When achievement scores are used, the analyses are performed five times—once for each plausible value—and the results are aggregated to produce accurate estimates of achievement and standard errors that incorporate both sampling and imputation errors.

The use of the IDB Analyzer is described in detail with worked examples in chapter 2 of both the *TIMSS 2011 User Guide for the International Database* and the *PIRLS 2011 User Guide for the International Database* (Foy, Arora, & Stanco, 2013; Foy & Drucker, 2013). Readers intending to use this user-friendly software are urged to read this user guide in detail.

In addition to IDB Analyzer for basic analysis and exploration of TIMSS and PIRLS data, NCES has developed a relatively simple, interactive online data-analysis tool: the International Data Explorer (IDE), can be found at <http://nces.ed.gov/surveys/international/ide/>. The IDE allows users to analyze all the international variables for all participating education systems and the U.S.-specific variables; however, it does not include U.S. restricted-use data. The IDE does not require SPSS for analyzing the data. It provides users with the capabilities to create statistical tables and charts of TIMSS and PIRLS data across countries and years on the website. This tool allows users to point and click in a self-contained module, unlike the IDB Analyzer software that must be used in conjunction with SPSS. Also unlike the IDB Analyzer, the IDE does not provide access to data files for merging, transforming, or otherwise manipulating data. This tool reports averages for subject by selected variables and exports reports in HTML, Excel, Word, or PDF.

SAS Programs and Macros

The *TIMSS 2011 User Guide for the International Database* and the *PIRLS 2011 User Guide for the International Database* also provide assistance for those investigators who wish to conduct their analyses using SAS. The user guide includes a number of SAS programs needed to process the SAS data files, compute survey results, and carry out example analyses. These are described in detail with worked examples in chapter 3 of the user guide. Readers intending to use SAS for their analyses are urged to read this chapter in detail.

The following SAS programs and macros are available:

- CONVERT.SAS: is used to convert SAS Export files into SAS data files.
- ASASCRM4.SAS, BSASCRM4.SAS: is used to convert the response codes on the achievement items to their corresponding score levels.
- JOIN.SAS: combines files of the same type from more than one education system.
- JACKGEN.SAS: is an SAS macro used to compute weighted percentages of students within defined subgroups, along with their means on a specified continuous variable. This macro generates replicate weights and computes standard errors using the jackknife repeated replication (JRR) methodology. The analysis variable can be any continuous variable. (When computing mean achievement scores with plausible values, the macro JACKPV.SAS should be used.)
- JACKPV.SAS: is an SAS macro used to compute weighted percentages of students within defined subgroups, along with their mean achievement on a scale using the available plausible values. This macro generates replicate weights and computes standard errors using the jackknife repeated replication (JRR) and multiple imputation methodologies. This macro should be used when achievement plausible values are used in an analysis.
- JACKREG.SAS: is a SAS macro used to compute weighted regression coefficients and their standard errors within defined subgroups. This macro can be used with any analysis variable, but is not appropriate for analyzing achievement with plausible values.
- JACKREGP.SAS: is a SAS macro program used to compute weighted regression coefficients and their standard errors within defined subgroups when using achievement plausible values as the dependent variable.

Special Considerations in Using the Teacher Data

The teachers in the TIMSS and PIRLS 2011 international databases are the teachers of nationally representative samples of students and are not representative samples of teachers in the participating countries. As a result, analyses with teacher data should be made with students as the units of analysis and reported in terms of students who are taught by teachers with a particular attribute.

When analyzing teacher data, it is first necessary to link the students to their respective teachers. The student-teacher linkage data files (AST/BST) were created for this purpose. Since student achievement scores (plausible values), jackknife replication information, and teacher weighting variables are found in the student-teacher linkage data files, it is only necessary to merge the teacher background data files with the student-teacher linkage data files. For analyses linking teacher variables to student background

variables, it is also necessary to merge the student background data files with the teacher background data files after having been combined with the student-teacher linkage data files.

In general, to perform analyses using the teacher background data files, follow the steps below.

1. Identify the variables of interest in the teacher background data files and note any specific national adaptations to the variables.
2. Retrieve the relevant variables from the teacher background data files, including analysis variables, classification variables, identification variables (IDCNTRY, IDTEACH, and IDLINK), and any other variables used in the selection of cases.
3. Retrieve the relevant variables from the student-teacher linkage data files, including plausible values of achievement, classification variables, identification variables (IDCNTRY, IDSTUD, IDTEACH, and IDLINK), sampling (JKZONE and JKREP) and weighting (MATWGT, SCIWGT, or TCHWGT) variables, and any other variables used in the selection of cases.
4. Merge the teacher background data files with the student-teacher linkage data files using the variables IDCNTRY, IDTEACH, and IDLINK.
5. If student background variables also are needed, merge the student background data files with the merged student-teacher data files from the previous step using the variables IDCNTRY and IDSTUD.

One further point to note: fourth-grade teachers were given a single questionnaire with mathematics and science sections or a reading section as pertinent to PIRLS. If a teacher taught only mathematics or only science to the TIMSS fourth-graders, that teacher would complete only one of these sections. In frequency distributions of the variables in these sections, teachers who did not answer the questions for this reason are shown as “not administered.”

Special Considerations in Using the School Data

In general, to perform analyses using the school background data files, follow the steps below.

1. Identify the variables of interest in the school and student background data files and note any specific national adaptations to the variables.
2. Retrieve the relevant variables from the school background data files, including analysis variables, classification variables, identification variables (IDCNTRY and IDSCHOOL), and any other variables used in the selection of cases.

3. Retrieve the relevant variables from the student background data files, including plausible values of achievement, classification variables, identification variables (IDCNTRY and IDSCHOOL), sampling (JKZONE and JKREP) and weighting (TOTWGT) variables, and any other variables used in the selection of cases.
4. Merge the school background data files with the student background data files using the variables IDCNTRY and IDSCHOOL.

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Appendix A. State Sampling Tables

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Table A-1. Number and percentage of students and schools included in the Florida TIMSS-PIRLS fourth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			204,215	100	81	100
High	City	15 percent or above	28,918	14.2	11	13.6
High	City	Below 15 percent	65	0.0	0	0.0
High	Suburb	15 percent or above	55,745	27.3	23	28.4
High	Suburb	Below 15 percent	1,060	0.5	0	0.0
High	Town	15 percent or above	7,673	3.8	4	4.9
High	Town	Below 15 percent	302	0.1	0	0.0
High	Rural	15 percent or above	12,758	6.2	3	3.7
High	Rural	Below 15 percent	2,951	1.4	1	1.2
Low	City	15 percent or above	17,799	8.7	6	7.4
Low	City	Below 15 percent	1,988	1.0	1	1.2
Low	Suburb	15 percent or above	40,423	19.8	16	19.8
Low	Suburb	Below 15 percent	11,287	5.5	4	4.9
Low	Town	15 percent or above	2,501	1.2	2	2.5
Low	Town	Below 15 percent	1,370	0.7	1	1.2
Low	Rural	15 percent or above	13,751	6.7	5	6.2
Low	Rural	Below 15 percent	5,624	2.8	4	4.9

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), Progress in International Reading Literacy Study (PIRLS), 2011.

Table A-2. Number and percentage of students and schools included in the North Carolina TIMSS fourth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			116,717	100	49	100
High	City	15 percent or above	11,521	9.9	5	10.2
High	City	Below 15 percent	0	0.0	0	0.0
High	Suburb	15 percent or above	3,833	3.3	1	2.0
High	Suburb	Below 15 percent	807	0.7	1	2.0
High	Town	15 percent or above	7,462	6.4	3	6.1
High	Town	Below 15 percent	99	0.1	0	0.0
High	Rural	15 percent or above	13,411	11.5	6	12.2
High	Rural	Below 15 percent	4,532	3.9	2	4.1
Low	City	15 percent or above	17,869	15.3	7	14.3
Low	City	Below 15 percent	1,754	1.5	1	2.0
Low	Suburb	15 percent or above	10,089	8.6	4	8.2
Low	Suburb	Below 15 percent	5,335	4.6	2	4.1
Low	Town	15 percent or above	5,473	4.7	2	4.1
Low	Town	Below 15 percent	1,603	1.4	1	2.0
Low	Rural	15 percent or above	21,644	18.5	10	20.4
Low	Rural	Below 15 percent	11,285	9.7	4	8.2

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” All private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-3. Number and percentage of students and schools included in the Alabama TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			58,410	100	63	100
High	City	15 percent or above	8,479	14.5	8	12.7
High	City	Below 15 percent	0	0.0	0	0.0
High	Suburb	15 percent or above	2,953	5.1	3	4.8
High	Suburb	Below 15 percent	199	0.3	0	0.0
High	Town	15 percent or above	4,905	8.4	4	6.3
High	Town	Below 15 percent	526	0.9	1	1.6
High	Rural	15 percent or above	9,690	16.6	11	17.5
High	Rural	Below 15 percent	3,396	5.8	3	4.8
Low	City	15 percent or above	3,859	6.6	4	6.3
Low	City	Below 15 percent	319	0.5	1	1.6
Low	Suburb	15 percent or above	5,738	9.8	4	6.3
Low	Suburb	Below 15 percent	1,924	3.3	5	7.9
Low	Town	15 percent or above	2,559	4.4	2	3.2
Low	Town	Below 15 percent	974	1.7	1	1.6
Low	Rural	15 percent or above	5,338	9.1	7	11.1
Low	Rural	Below 15 percent	7,551	12.9	9	14.3

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-4. Number and percentage of students and schools included in the California TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			459,628	100	94	100
High	City	15 percent or above	127,809	27.8	27	28.7
High	City	Below 15 percent	760	0.2	0	0.0
High	Suburb	15 percent or above	94,046	20.5	20	21.3
High	Suburb	Below 15 percent	199	0.0	0	0.0
High	Town	15 percent or above	20,087	4.4	5	5.3
High	Town	Below 15 percent	464	0.1	0	0.0
High	Rural	15 percent or above	14,531	3.2	4	4.3
High	Rural	Below 15 percent	541	0.1	0	0.0
Low	City	15 percent or above	57,810	12.6	12	12.8
Low	City	Below 15 percent	13,910	3.0	3	3.2
Low	Suburb	15 percent or above	75,221	16.4	14	14.9
Low	Suburb	Below 15 percent	15,827	3.4	2	2.1
Low	Town	15 percent or above	9,218	2.0	2	2.1
Low	Town	Below 15 percent	1,685	0.4	0	0.0
Low	Rural	15 percent or above	23,414	5.1	5	5.3
Low	Rural	Below 15 percent	4,106	0.9	0	0.0

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-5. Number and percentage of students and schools included in the Colorado TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			58,010	100	60	100
High	City	15 percent or above	9,491	16.4	8	13.3
High	City	Below 15 percent	0	0.0	0	0.0
High	Suburb	15 percent or above	3,465	6.0	5	8.3
High	Suburb	Below 15 percent	0	0.0	0	0.0
High	Town	15 percent or above	1,941	3.3	2	3.3
High	Town	Below 15 percent	0	0.0	0	0.0
High	Rural	15 percent or above	1,228	2.1	1	1.7
High	Rural	Below 15 percent	119	0.2	0	0.0
Low	City	15 percent or above	6,788	11.7	9	15.0
Low	City	Below 15 percent	2,874	5.0	3	5.0
Low	Suburb	15 percent or above	7,689	13.3	7	11.7
Low	Suburb	Below 15 percent	7,817	13.5	8	13.3
Low	Town	15 percent or above	2,123	3.7	2	3.3
Low	Town	Below 15 percent	1,647	2.8	2	3.3
Low	Rural	15 percent or above	6,214	10.7	8	13.3
Low	Rural	Below 15 percent	6,614	11.4	5	8.3

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-6. Number and percentage of students and schools included in the Connecticut TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			42,577	100	63	100
High	City	15 percent or above	4,728	11.1	6	9.5
High	City	Below 15 percent	0	0.0	0	0.0
High	Suburb	15 percent or above	3,063	7.2	5	7.9
High	Suburb	Below 15 percent	327	0.8	1	1.6
High	Town	15 percent or above	240	0.6	0	0.0
High	Town	Below 15 percent	0	0.0	0	0.0
High	Rural	15 percent or above	5	0.0	0	0.0
High	Rural	Below 15 percent	0	0.0	0	0.0
Low	City	15 percent or above	5,486	12.9	10	15.9
Low	City	Below 15 percent	390	0.9	0	0.0
Low	Suburb	15 percent or above	4,365	10.3	5	7.9
Low	Suburb	Below 15 percent	15,948	37.5	25	39.7
Low	Town	15 percent or above	0	0.0	0	0.0
Low	Town	Below 15 percent	1,356	3.2	1	1.6
Low	Rural	15 percent or above	788	1.9	1	1.6
Low	Rural	Below 15 percent	5,881	13.8	9	14.3

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-7. Number and percentage of students and schools included in the Florida TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			196,879	100	65	100
High	City	15 percent or above	21,179	10.8	8	12.3
High	City	Below 15 percent	0	0.0	0	0.0
High	Suburb	15 percent or above	42,823	21.8	14	21.5
High	Suburb	Below 15 percent	853	0.4	1	1.5
High	Town	15 percent or above	7,525	3.8	1	1.5
High	Town	Below 15 percent	189	0.1	0	0.0
High	Rural	15 percent or above	11,033	5.6	4	6.2
High	Rural	Below 15 percent	1,281	0.7	0	0.0
Low	City	15 percent or above	22,953	11.7	12	18.5
Low	City	Below 15 percent	1,226	0.6	0	0.0
Low	Suburb	15 percent or above	47,056	23.9	13	20.0
Low	Suburb	Below 15 percent	11,063	5.6	3	4.6
Low	Town	15 percent or above	4,385	2.2	1	1.5
Low	Town	Below 15 percent	1,481	0.8	1	1.5
Low	Rural	15 percent or above	18,242	9.3	5	7.7
Low	Rural	Below 15 percent	5,590	2.8	2	3.1

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-8. Number and percentage of students and schools included in the Indiana TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			80,576	100	62	100
High	City	15 percent or above	15,323	19.0	13	21.0
High	City	Below 15 percent	404	0.5	1	1.6
High	Suburb	15 percent or above	2,724	3.4	2	3.2
High	Suburb	Below 15 percent	368	0.5	0	0.0
High	Town	15 percent or above	559	0.7	1	1.6
High	Town	Below 15 percent	1,579	2.0	2	3.2
High	Rural	15 percent or above	1,101	1.4	1	1.6
High	Rural	Below 15 percent	258	0.3	0	0.0
Low	City	15 percent or above	2,537	3.1	2	3.2
Low	City	Below 15 percent	3,448	4.3	2	3.2
Low	Suburb	15 percent or above	6,286	7.8	3	4.8
Low	Suburb	Below 15 percent	10,908	13.5	7	11.3
Low	Town	15 percent or above	873	1.1	0	0.0
Low	Town	Below 15 percent	11,717	14.5	11	17.7
Low	Rural	15 percent or above	277	0.3	0	0.0
Low	Rural	Below 15 percent	22,214	27.6	17	27.4

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-9. Number and percentage of students and schools included in the Massachusetts TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			72,953	100	58	100
High	City	15 percent or above	9,779	13.4	7	12.1
High	City	Below 15 percent	464	0.6	1	1.7
High	Suburb	15 percent or above	8,341	11.4	7	12.1
High	Suburb	Below 15 percent	5	0.0	0	0.0
High	Town	15 percent or above	0	0.0	0	0.0
High	Town	Below 15 percent	189	0.3	0	0.0
High	Rural	15 percent or above	0	0.0	0	0.0
High	Rural	Below 15 percent	0	0.0	0	0.0
Low	City	15 percent or above	2,515	3.4	2	3.4
Low	City	Below 15 percent	2,279	3.1	3	5.2
Low	Suburb	15 percent or above	6,300	8.6	5	8.6
Low	Suburb	Below 15 percent	32,747	44.9	25	43.1
Low	Town	15 percent or above	566	0.8	1	1.7
Low	Town	Below 15 percent	967	1.3	0	0.0
Low	Rural	15 percent or above	0	0.0	0	0.0
Low	Rural	Below 15 percent	8,801	12.1	7	12.1

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-10. Number and percentage of students and schools included in the Minnesota TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			62,259	100	60	100
High	City	15 percent or above	5,070	8.1	4	6.7
High	City	Below 15 percent	350	0.6	0	0.0
High	Suburb	15 percent or above	1,396	2.2	1	1.7
High	Suburb	Below 15 percent	12	0.0	0	0.0
High	Town	15 percent or above	341	0.5	1	1.7
High	Town	Below 15 percent	109	0.2	0	0.0
High	Rural	15 percent or above	625	1.0	1	1.7
High	Rural	Below 15 percent	521	0.8	0	0.0
Low	City	15 percent or above	4,217	6.8	6	10.0
Low	City	Below 15 percent	3,110	5.0	3	5.0
Low	Suburb	15 percent or above	8,832	14.2	8	13.3
Low	Suburb	Below 15 percent	9,752	15.7	10	16.7
Low	Town	15 percent or above	2,631	4.2	3	5.0
Low	Town	Below 15 percent	9,516	15.3	8	13.3
Low	Rural	15 percent or above	1,403	2.3	1	1.7
Low	Rural	Below 15 percent	14,374	23.1	14	23.3

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Table A-11. Number and percentage of students and schools included in the North Carolina TIMSS eighth-grade school sampling frame and sample, by poverty level, locale, and race/ethnicity status: 2011

Poverty level	Locale	Race/ethnicity status	Frame		Sample	
			Measure of size	Percent	Number of schools	Percent
Total			110,671	100	62	100
High	City	15 percent or above	8,420	7.6	5	8.1
High	City	Below 15 percent	0	0.0	0	0.0
High	Suburb	15 percent or above	1,646	1.5	1	1.6
High	Suburb	Below 15 percent	291	0.3	0	0.0
High	Town	15 percent or above	6,458	5.8	2	3.2
High	Town	Below 15 percent	546	0.5	0	0.0
High	Rural	15 percent or above	13,462	12.2	8	12.9
High	Rural	Below 15 percent	1,746	1.6	2	3.2
Low	City	15 percent or above	17,283	15.6	10	16.1
Low	City	Below 15 percent	1,298	1.2	2	3.2
Low	Suburb	15 percent or above	11,487	10.4	6	9.7
Low	Suburb	Below 15 percent	4,114	3.7	2	3.2
Low	Town	15 percent or above	6,233	5.6	3	4.8
Low	Town	Below 15 percent	1,128	1.0	0	0.0
Low	Rural	15 percent or above	24,868	22.5	14	22.6
Low	Rural	Below 15 percent	11,691	10.6	7	11.3

NOTE: Detail may not sum to totals because of rounding. For public schools, “high” poverty is defined as having 50 percent or more of the students eligible for participation in the National School Lunch Program (NSLP), and “low” poverty is defined as having less than 50 percent eligible. Because no NSLP data were available for private schools, all private schools are categorized as “low.” For definitions of these urban-centric locales, see <http://nces.ed.gov/surveys/urbaned/definitions.asp>. Race/ethnicity status refers to the percentage of Black, Hispanic, Asian and Pacific Islander, and American Indian and Alaska Native students. Black includes African American and Hispanic includes Latino. Racial categories exclude Hispanic origin. Asian and Pacific Islander are combined into a single category due to the fact that that the frame was developed using the previous NCES guidelines for combining Asian and Pacific Islanders, while the U.S. national report was developed under new guidelines that call for reporting out Asian separately when possible. The measure of size is defined as the estimated number of students enrolled in the target grade with a minimum of 5 students per school. These differ slightly from the estimated student sample size reported in Joncas 2012 (Exhibit 1 and 2), which reports the estimate of the number of students in the sampled schools with no minimum per school.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Appendix B. State Participation Rates

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Table B-1. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in Alabama that participated in TIMSS, and their participation rates: 2011

	Number	Rates	
		Unweighted	Weighted
Sampled schools	63		
Excluded and ineligible	3		
Eligible	60		
Participated (among original sampled set of schools)	55	92	92
Substitutes	0		
Participated (original and substitute schools combined)	55	92	92
Classrooms in participating schools			
Total	540		
Excluded	13		
Eligible	527		
Sampled	99		
Participating	99	100	100
Students in participating schools			
Sampled	2,414		
Excluded	87		
Withdrawn	27		
Eligible	2,300		
Absent/refusal	187		
Participating	2,113	92	92

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Alabama TIMSS grade 8 sample

The Alabama TIMSS eighth grade sample had a (weighted) student exclusion rate of 4.6 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (95.4 percent) as acceptable.

Table B-2. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in California that participated in TIMSS, and their participation rates: 2011

		Rates	
	Number	Unweighted	Weighted
Schools			
Sampled	94		
Excluded and ineligible	1		
Eligible	93		
Participating	79	85	85
Substitutes	3		
Participating (all schools)	82	88	88
Classrooms in participating schools			
Total	1,252		
Excluded	107		
Eligible	1,145		
Sampled	118		
Participating	118	99	99
Students in participating schools			
Sampled	2,898		
Excluded	47		
Withdrawn	52		
Eligible	2,799		
Absent/refusal	185		
Participating	2,614	93	94

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the California TIMSS grade 8 sample

The California TIMSS eighth grade sample had a (weighted) student exclusion rate of 5.6 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (94.4 percent) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show California annotated to indicate this fact.

Table B-3. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in Colorado that participated in TIMSS, and their participation rates: 2011

		Rates	
	Number	Unweighted	Weighted
Schools			
Sampled	60		
Excluded and ineligible	0		
Eligible	60		
Participating	50	83	84
Substitutes	3		
Participating (all schools)	53	88	89
Classrooms in participating schools			
Total	535		
Excluded	21		
Eligible	514		
Sampled	97		
Participating	97	100	100
Students in participating schools			
Sampled	2,395		
Excluded	47		
Withdrawn	60		
Eligible	2,288		
Absent/refusal	121		
Participating	2,167	95	94

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Colorado TIMSS grade 8 sample

The Colorado TIMSS eighth grade sample had a (weighted) student exclusion rate of 4.1 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (95.9 percent) as acceptable.

Table B-4. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in Connecticut that participated in TIMSS, and their participation rates: 2011

	Number	Rates	
		Unweighted	Weighted
Schools			
Sampled	63		
Excluded and ineligible	1		
Eligible	62	100	100
Participating	62		
Substitutes	0		
Participating (all schools)	62	100	100
Classrooms in participating schools			
Total	680		
Excluded	25		
Eligible	655		
Sampled	113		
Participating	113	100	100
Students in participating schools			
Sampled	2,356		
Excluded	115		
Withdrawn	16		
Eligible	2,225		
Absent/refusal	126		
Participating	2,099	94	94

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Connecticut TIMSS grade 8 sample

The Connecticut TIMSS eighth grade sample had a (weighted) student exclusion rate of 8.5 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (91.5 percent) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show Connecticut annotated to indicate this fact.

Table B-5. Number of sampled schools, fourth-grade classrooms, and fourth-grade students in Florida that participated in PIRLS, and their participation rates: 2011

		Rates	
	Number	Unweighted	Weighted
Schools			
Sampled	81		
Excluded and ineligible	1		
Eligible	80	96	96
Participating	77		
Substitutes	0		
Participating (all schools)	77	96	96
Classrooms in participating schools			
Total	456		
Excluded	26		
Eligible	430		
Sampled	148		
Participating	148	99	99
Students in participating schools			
Sampled	3,052		
Excluded	269		
Withdrawn	43		
Eligible	2,740		
Absent/refusal	142		
Participating	2,598	95	95

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international PIRLS rates, whose classroom and student participation rates do include substitute schools in their calculation. The exclusion rates for the PIRLS Florida fourth grade sample are presented following Table B-6.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Progress in International Reading Literacy Study (PIRLS), 2011.

Table B-6. Number of sampled schools, fourth- and eighth-grade classrooms, and students in Florida that participated in TIMSS, and their participation rates, by grade: 2011

	Number		Rates			
	Grade 4	Grade 8	Grade 4		Grade 8	
			Unweighted	Weighted	Unweighted	Weighted
Schools						
Sampled	81	65				
Excluded and ineligible	1	1				
Eligible	80	64				
Participating	77	60	96	96	94	94
Substitutes	0	0				
Participating (all schools)	77	60	96	96	94	94
Classrooms in participating schools						
Total	456	1,142				
Excluded	26	56				
Eligible	430	1,086				
Sampled	149	100				
Participating	149	100	100	100	98	98
Students in participating schools						
Sampled	3,121	1,986				
Excluded	265	87				
Withdrawn	43	25				
Eligible	2,813	1,874				
Absent/refusal	152	162				
Participating	2,661	1,712	95	95	91	91

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Florida TIMSS and PIRLS grade 4 samples and TIMSS grade 8 sample

Florida had a (weighted) student exclusion rate of 12.1 percent in the fourth-grade for TIMSS, 12.9 percent for PIRLS, and 6.9 percent for TIMSS in the eighth-grade, based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (87.9 percent for both TIMSS, 87.1 percent for PIRLS at fourth grade and 93.1 percent for eighth grade) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show the Florida annotated to indicate this fact.

Table B-7. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in Indiana that participated in TIMSS, and their participation rates: 2011

	Number	Rates	
		Unweighted	Weighted
Schools			
Sampled	62		
Excluded and ineligible	4		
Eligible	58		
Participating	55	95	94
Substitutes	1		
Participating (all schools)	56	97	97
Classrooms in participating schools			
Total	652		
Excluded	46		
Eligible	606		
Sampled	105		
Participating	105	100	100
Students in participating schools			
Sampled	2,501		
Excluded	97		
Withdrawn	49		
Eligible	2,355		
Absent/refusal	95		
Participating	2,260	96	96

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Indiana TIMSS grade 8 sample

The Indiana TIMSS eighth grade sample had a (weighted) student exclusion rate of 6.3 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (93.7 percent) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show Indiana annotated to indicate this fact.

Table B-8. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in Massachusetts that participated in TIMSS, and their participation rates: 2011

		Rates	
	Number	Unweighted	Weighted
Schools			
Sampled	58		
Excluded and ineligible	2		
Eligible	56		
Participating	56	100	100
Substitutes	0		
Participating (all schools)	56	100	100
Classrooms in participating schools			
Total	592		
Excluded	47		
Eligible	545		
Sampled	103		
Participating	103	100	100
Students in participating schools			
Sampled	2,296		
Excluded	112		
Withdrawn	20		
Eligible	2,164		
Absent/refusal	89		
Participating	2,075	96	96

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Massachusetts TIMSS grade 8 sample

The Massachusetts TIMSS eighth grade sample had a (weighted) student exclusion rate of 7.9 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (92.1 percent) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show Massachusetts annotated to indicate this fact.

Table B-9. Number of sampled schools, eighth-grade classrooms, and eighth-grade students in Minnesota that participated in TIMSS, and their participation rates: 2011

		Rates	
	Numbers	Unweighted	Weighted
Schools			
Sampled	60		
Excluded and ineligible	4		
Eligible	56		
Participating	51	91	91
Substitutes	4		
Participating (all schools)	55	98	98
Classrooms in participating schools			
Total	691		
Excluded	65		
Eligible	626		
Sampled	102		
Participating	102	100	100
Students in participating schools			
Sampled	2,720		
Excluded	61		
Withdrawn	32		
Eligible	2,627		
Absent/refusal	127		
Participating	2,500	95	95

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the Minnesota TIMSS grade 8 sample

The Minnesota TIMSS eighth grade sample had a (weighted) student exclusion rate of 4.3 percent based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (95.7 percent) as acceptable.

Table B-10. Number of sampled schools, fourth- and eighth-grade classrooms, and students in North Carolina that participated in TIMSS, and their participation rates, by grade: 2011

	Numbers		Rates			
	Grade 4	Grade 8	Grade 4		Grade 8	
			Unweighted	Weighted	Unweighted	Weighted
Schools						
Sampled	49	62				
Excluded and ineligible	0	2				
Eligible	49	60				
Participating	46	59	94	94	98	98
Substitutes	0	0				
Participating (all schools)	46	59	94	94	98	98
Classrooms in participating schools						
Total	212	626				
Excluded	4	48				
Eligible	208	578				
Sampled	92	103				
Participating	92	103	100	100	100	100
Students in participating schools						
Sampled	2,104	2,434				
Excluded	203	203				
Withdrawn	13	24				
Eligible	1,888	2,207				
Absent/refusal	96	104				
Participating	1,792	2,103	95	95	95	95

NOTE: NCES standards (Standard 1-3-8) indicate that participation rates should be calculated without including substitute schools because substitute schools do not have an independent probability of selection (National Center for Education Statistics, 2002). However, the participation rates shown in this table are the official international TIMSS rates, whose classroom and student participation rates do include substitute schools in their calculation.

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), Trends in International Mathematics and Science Study (TIMSS), 2011.

Exclusions in the North Carolina TIMSS grades 4 and 8 samples

North Carolina had a (weighted) student exclusion rate of 10.1 percent in the fourth-grade for TIMSS and 11.4 percent for TIMSS in the eighth-grade, based on the combination of whole-class and within-class exclusions. IEA standards define this degree of coverage of the national target population (89.9 percent for both TIMSS at fourth grade and 88.6 percent for eighth-grade) as acceptable though falling below the desired range of 95 percent or better. The tabulations shown in the international reports show North Carolina annotated to indicate this fact.

APPENDIX C

TIMSS & PIRLS 2011 Recruitment Materials

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State PIRLS & TIMSS letter

[Date]

[Title] [Name First] [Name Last]

[Title/Department]

[State]

[Address 1]

[Address 2]

[City], [State] [Zip code]

Dear [Title] [Name Last]:

The United States will be participating in two important international studies in 2011 to help benchmark student performance in the United States compared to that in other countries around the world. Some schools in your state have been randomly selected to participate in these studies in the spring of 2011. I am writing to ask your agency to support the participation of schools in your state in these two studies: the Trends in International Mathematics and Science Study (TIMSS) 2011 and the Progress in International Reading Literacy Study (PIRLS) 2011.

TIMSS is administered every four years in more than 60 countries and provides important information for internationally benchmarking U.S. performance in mathematics and science at the fourth- and eighth-grade levels against top countries around the world. PIRLS is administered every five years in more than 50 countries and provides similarly important international benchmarking information in fourth-grade reading.

TIMSS, PIRLS, and the process for participating schools are described in more detail in materials enclosed with this letter. The studies are sponsored in the United States by the National Center for Education Statistics in the U.S. Department of Education and are conducted by Westat of Rockville, MD. The U.S. Office of Management and Budget has approved the data collection under OMB # 1850-0645 v5. While participation in this study is entirely voluntary, we ask your agency to support participation on the part of schools in your state so that the United States has a representative sample of schools across the country.

NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by your schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Reports of the findings from the assessments will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

Within the next few weeks, a representative of Westat will contact sampled school districts and schools to discuss conducting data collection. In the meantime, if you have questions about the study, please do not hesitate to call [insert name of contact] at 1-888-369-5033 or send an email to TIMSS-PIRLS@westat.com. You may also get more information about these studies by contacting Dr. Patrick Gonzales at NCES at (415) 920-9229 or visiting the TIMSS and PIRLS websites at: <http://nces.ed.gov/timss/> <http://nces.ed.gov/surveys/pirls/>.

Thank you for your time and support. TIMSS and PIRLS are important elements in the U.S. effort to benchmark the performance and progress of our education system against international standards.

Sincerely,

Stuart Kerachsky

Acting Commissioner

cc: [State assessment coordinator name]

Enclosures

School district PIRLS & TIMSS letter

[Date]

[Title] [Name First] [Name Last], [Title/Department]
[School District]
[Address 1]
[City], [State] [Zip code]

Dear [Title] [Name Last]:

The United States will be participating in two important international studies in 2011 to help benchmark student performance in the United States against that in other countries around the world: the Trends in International Mathematics and Science Study (TIMSS) 2011 and the Progress in International Reading Literacy Study (PIRLS) 2011. We are contacting you because one or more schools in your diocese have been randomly selected to represent the United States in these studies in the spring of 2011.

TIMSS is administered every four years in more than 60 countries and provides important information for internationally benchmarking U.S. performance in mathematics and science at the fourth- and eighth-grade against top countries around the world. PIRLS is administered every five years in more than 50 countries and provides similarly important international benchmarking information in fourth-grade reading.

We ask your agency to support the participation of schools in your diocese in the TIMSS and PIRLS studies as these assessments are vital in understanding how the knowledge and skills of U.S. students compare with those of their peers in other countries. Schools that participate in the TIMSS and PIRLS studies will be partially compensated for their time and efforts: participating schools will receive \$200, their school-level coordinator will receive \$100, and each student that takes the assessment will receive a small gift.

Materials enclosed with this letter describe TIMSS and PIRLS and the process for participating schools in more detail. Both assessments are sponsored by the U.S. Department of Education's National Center for Education Statistics and are conducted by Westat, a research organization based in the Washington D.C. area. The U.S. Office of Management and Budget has approved this data collection under OMB #1850-0645 v5. While participation in this study is entirely voluntary, we ask your agency to support the participation of schools in your diocese that the United States has a representative sample of schools across the country.

NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by your schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). We will disclose the names of schools in each district only to the governing district for each school, and we ask that each district maintain the confidentiality of the sampled schools in the TIMSS and PIRLS studies. Reports of the findings from these assessments will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

If you have any questions, please do not hesitate to call the TIMSS and PIRLS Home Office at 1-888-369-5033 or send an email to TIMSS-PIRLS@westat.com. You may also get more information about these studies by contacting Dr. Patrick Gonzales at NCES at (415) 920-9229 or visiting the TIMSS and PIRLS websites at: <http://nces.ed.gov/timss/> and <http://nces.ed.gov/surveys/pirls/>.

Thank you for your time and support. TIMSS and PIRLS are important elements in the U.S. effort to benchmark the performance and progress of our education system against international standards.

Sincerely,

Stuart Kerachsky
Acting Commissioner

Enclosures

School district TIMSS letter

[Date]

[Title] [Name First] [Name Last], [Title/Department]
[School District]
[Address 1]
[City], [State] [Zip code]

I am writing to inform you about the upcoming Trends in International Mathematics and Science Study (TIMSS) 2011, in which the United States will participate along with more than 60 other countries. TIMSS provides important international benchmarking information in fourth- and eighth-grade mathematics and science. We are notifying you now because one or more schools in your district have been randomly selected to take part in the TIMSS study in the spring of 2011.

We ask your agency to support the participation of schools in your district in the TIMSS assessment as it is vital to understanding how the knowledge and skills of U.S. students compare to those of their peers in other countries. Schools that participate in TIMSS will be compensated for their time and efforts. Participating schools will receive \$200, their school-level coordinator will receive \$100, and each student that takes the assessment will receive a small gift.

Materials enclosed with this letter describe TIMSS and the process for participating schools in more detail. TIMSS is sponsored by the U.S. Department of Education's National Center for Education Statistics and is conducted by Westat, a research organization based in the Washington D.C. area. The U.S. Office of Management and Budget has approved the data collection under OMB #1850-0645 v5. While participation in this study is entirely voluntary, we ask your agency to support the participation of schools in your district so that the United States has a representative sample of schools across the country.

Within the next few days, a representative of Westat will contact the following school or schools in your district that have been selected for the assessment: [LIST SAMPLED SCHOOLS HERE...]

NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by your schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). We will disclose the names of schools in each district only to the governing district for each school, and we ask that each district maintain the confidentiality of the sampled schools in the TIMSS study. Reports of the findings from the assessment will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

If you have any questions, please do not hesitate to call the TIMSS Home Office at 1-888-369-5033 or send an email to TIMSS-PIRLS@westat.com. You may also get more information about these studies by contacting Dr. Patrick Gonzales at NCES at (415) 920-9229 or visiting the TIMSS website at: <http://nces.ed.gov/timss/>.

Thank you for your time and support. TIMSS is an important element in the U.S. effort to benchmark the performance and progress of our education system against international standards.

Sincerely,

A handwritten signature in black ink, appearing to read "Stuart Kerachsky". The signature is fluid and cursive, with a large, stylized "S" at the beginning and a long, sweeping underline.

Stuart Kerachsky
Acting Commissioner

Enclosures

School PIRLS & TIMSS letter

[Date]

[Title] [Name First] [Name Last], [Title/Department]
[School District]
[Address 1]
[City], [State] [Zip code]

Dear [Title] [Name Last]:

The United States will be participating in two important international studies in 2011 to help benchmark student performance in the United States against that in other countries around the world: the Trends in International Mathematics and Science Study (TIMSS) 2011 and the Progress in International Reading Literacy Study (PIRLS) 2011. We are contacting you because your school has been selected to represent the United States in the TIMSS and PIRLS international studies in the spring of 2011.

TIMSS is administered every four years in more than 60 countries and provides important information for internationally benchmarking U.S. performance in mathematics and science at the fourth- and eighth-grade levels against top countries around the world. PIRLS is administered every five years in more than 50 countries and provides similarly important international benchmarking information in fourth-grade reading.

I encourage your school's participation in the TIMSS and PIRLS assessments as they are vital to understanding how the knowledge and skills of U.S. students compare with those of their peers in other countries. Schools that participate in the TIMSS and PIRLS studies will be compensated in part for their time and efforts: participating schools will receive \$200, their school-level coordinator will receive \$100, and each student that takes the assessment will receive a small gift.

Materials enclosed with this letter describe TIMSS and PIRLS and the process for participating schools in more detail. Both assessments are sponsored in the United States by the U.S. Department of Education's National Center for Education Statistics and are conducted by Westat of Rockville, MD. The U.S. Office of Management and Budget has approved the data collection under OMB #1850-0645 v5. We hope you will participate in this study so that the United States has a representative sample of schools across the country; however, participation in this study is entirely voluntary.

NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by your schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). We will only disclose the names of schools in each district to the governing district for each school, and we have asked that each district maintain the confidentiality of the sampled schools in the TIMSS and PIRLS study. Reports of the findings from these assessments will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

Within the next few days, a representative of Westat will call you to discuss your participation in the assessment. In the meantime, if you have any questions about the TIMSS and PIRLS study or your school's participation, please feel free to call 1-888-369-5033 or send an email to TIMSS-PIRLS@westat.com. You may also get more information about these studies by contacting Dr. Patrick Gonzales at NCES at (415) 920-9229 or visiting the TIMSS and PIRLS websites at: <http://nces.ed.gov/timss/> and <http://nces.ed.gov/surveys/pirls/>.

Thank you for your time and support. TIMSS and PIRLS are important elements in the U.S. effort to benchmark the performance and progress of our education system against international standards.

Sincerely,

Stuart Kerachsky
Acting Commissioner

Enclosures

School TIMSS letter

[Date]

[Title] [Name First] [Name Last], [Title/Department]

[School District]

[Address 1]

[City], [State] [Zip code]

Dear [Title] [Name Last]:

I am writing to inform you about the upcoming Trends in International Mathematics and Science Study (TIMSS) 2011, in which the United States will participate along with more than 60 other countries. TIMSS provides important international benchmarking information in fourth- and eighth-grade mathematics and science. We are notifying you now because your school has been randomly selected to take part in the TIMSS study in the spring of 2011.

I encourage your school's participation in the TIMSS assessment as it is vital in understanding how the knowledge and skills of U.S. students compare with those of their peers in other countries. Schools that participate in TIMSS will be compensated in part for their time and efforts: participating schools will receive \$200, their school-level coordinator will receive \$100, and each student that takes the assessment will receive a small gift

Materials enclosed with this letter describe TIMSS and the process for participating schools in more detail. Both assessments are sponsored in the United States by the U.S. Department of Education's National Center for Education Statistics and are conducted by Westat of Rockville, MD. The U.S. Office of Management and Budget has approved the data collection under OMB # 1850-0645 v5. We hope you will participate in this study so that the United States has a representative sample of schools across the country; however, participation in this study is entirely voluntary.

NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by your schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). We will only disclose the names of schools in each district to the governing district for each school, and we have asked that each district maintain the confidentiality of the sampled schools in the TIMSS study. Reports of the findings from the assessment will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

Within the next few days, a representative of Westat will call you to discuss your participation in TIMSS. In the meantime, if you have any questions about the TIMSS or your school's participation, please feel free to call 1-888-369-5033 or send an email to TIMSS-PIRLS@westat.com. You may also get more information about these studies by contacting Dr. Patrick Gonzales at NCES at (415) 920-9229 or visiting the TIMSS website at: <http://nces.ed.gov/timss/>.

Thank you for your time and support. TIMSS is an element in the U.S. effort to benchmark the performance and progress of our education system against international standards.

Sincerely,

Stuart Kerachsky
Acting Commissioner
Enclosures

Exhibit C--6. TIMSS 2011 Fourth-Grade Notification Letter

Sample Notification Letter, TIMSS Grade 4

SCHOOL LETTERHEAD

Dear Parent or Guardian,

Our school has accepted an invitation from the National Center for Education Statistics (NCES), U.S. Department of Education, to participate in an important international study of student learning. This study is called TIMSS for short; the full name is the Trends in International Mathematics and Science Study. TIMSS looks at student mathematics and science achievement in schools around the world and documents worldwide trends in student knowledge of mathematics and science since 1995.

The enclosed summary sheet provides some background to TIMSS, explains what is involved for each student selected to participate in the study, and gives a contact phone number and email address where you can find answers to any questions you might have.

{Insert number} of our 4th -grade classes will take part. {This/One of these} is your child's class. {This class/These two classes}, along with some {500} other classes of 4th graders nationwide, will contribute to this picture of what U.S. 4th graders know about mathematics and science, and how they compare with 4th graders worldwide.

To have an accurate picture of what U.S. 4th graders can do, it is important that each student selected take part in the study. I urge you to support this effort by encouraging your child to take part; however, participation in this study is entirely voluntary. Previous experience suggests that students actually enjoy taking part, and participating students will receive a small gift, which we think they will like.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

Thank you for taking the time to think about this. We wish you all the best.

Sincerely,

Enclosures:
Facts About TIMSS for Parents

Exhibit C--6. TIMSS 2011 Fourth-Grade Notification Letter - Continued

Sample Notification Letter, TIMSS Grade 4

SCHOOL LETTERHEAD

Estimado padre/madre o tutor,

Nuestra escuela ha aceptado una invitación del Centro Nacional de Estadísticas de la Educación (NCES, por sus siglas en inglés) del Departamento de Educación de Estados Unidos para participar en un importante estudio internacional sobre el aprendizaje estudiantil. El nombre corto de este estudio es TIMSS; abreviación de Estudio Internacional Sobre las Tendencias en Matemáticas y Ciencias. Desde 1995 TIMSS ha observado los logros de los estudiantes en matemáticas y ciencias en las escuelas del mundo y ha documentado las tendencias mundiales en el conocimiento estudiantil de matemáticas y ciencias.

El resumen adjunto ofrece información de trasfondo de TIMSS, explica lo que implica la participación en el estudio para cada estudiante seleccionado e incluye un número de teléfono y un correo electrónico de contacto donde usted podrá encontrar respuestas a cualquier pregunta que tenga.

{Insert number} de nuestras clases de cuarto grado participarán. {Esta/Una de estas} es la clase de su hijo. {Esta clase/Estas dos clases}, junto con otras {500} clases de estudiantes de cuarto grado en todo el país, contribuirán a mostrar lo que saben los estudiantes de cuarto grado en Estados Unidos sobre matemáticas y ciencias, y cómo se comparan con estudiantes de cuarto grado alrededor del mundo.

Para tener una imagen precisa de lo que los estudiantes de cuarto grado en Estados Unidos pueden hacer, es importante que cada estudiante seleccionado participe en el estudio. Lo invito a que apoye este esfuerzo animando a su hijo a participar; sin embargo, la participación en este estudio es completamente voluntaria. Las experiencias anteriores parecen indicar que los estudiantes disfrutaban de su participación. Además, los estudiantes que participen recibirán un pequeño regalo que creemos les gustará.

Toda la información que se reúna es completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Por ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

Gracias por tomarse el tiempo de considerar este estudio. Reciba nuestros mejores deseos.

Atentamente,

Se adjuntan los siguientes documentos:
Información sobre TIMSS para los padres

Exhibit C--7. TIMSS 2011 Fourth-Grade Implicit Consent Letter

Sample Implicit Consent Letter, TIMSS Grade 4

SCHOOL LETTERHEAD

Dear Parent or Guardian,

Our school has accepted an invitation from the National Center for Education Statistics (NCES), U.S. Department of Education, to participate in an important international study of student learning. This study is called TIMSS for short; the full name is the Trends in International Mathematics and Science Study. TIMSS looks at student mathematics and science achievement in schools around the world and documents worldwide trends in student knowledge of mathematics and science since 1995.

The enclosed summary sheet provides some background to TIMSS, explains what is involved for each student selected to participate in the study, and gives a contact phone number and email address where you can find answers to any questions you might have.

{Insert number} of our 4th-grade classes will take part. {This/One of these} is your child's class. {This class/These two classes}, along with some {500} other classes of 4th graders nationwide, will contribute to this picture of what U.S. 4th graders know about mathematics and science, and how they compare with 4th graders worldwide.

To have an accurate picture of what U.S. 4th graders can do, it is important that each student selected take part in the study. I urge you to support this effort by encouraging your child to take part; however, participation in this study is entirely voluntary. Previous experience suggests that students actually enjoy taking part, and participating students will receive a small gift, which we think they will like.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

If you have any objection to your child joining in the TIMSS activities please let us know by completing the attached form ('Being Part of TIMSS') and returning it to the school.

Thank you for taking the time to think about this. We wish you all the best.

Sincerely,

Enclosures:

Facts About TIMSS for Parents
Being Part of TIMSS

TIMSS Implicit Consent Form

Being Part of TIMSS

We would like very much to have your child take part in the TIMSS project along with his/her classmates. Student participation in TIMSS is critical to the success of the study and, ultimately, to the nation's interests in improving mathematics and science education. Your child will be included in TIMSS unless you indicate otherwise. If you do not want your child to participate, please check the "No" box below, sign the form and send it back to the school. The school will make arrangements for your child to undertake some other activities during the time that the other students are involved with TIMSS.

☐

No, I do not want my child to take part in the study.

Child's Name: _____
First Middle Last

Parent's or Guardian's Signature

Date

Thank you for taking the time to think about this very important project.

Sample Implicit Consent Letter, TIMSS Grade 4

SCHOOL LETTERHEAD

Estimado padre/madre o tutor,

Nuestra escuela ha aceptado una invitación del Centro Nacional de Estadísticas de la Educación (NCES, por sus siglas en inglés) del Departamento de Educación de Estados Unidos para participar en un importante estudio internacional sobre el aprendizaje estudiantil. El nombre corto de este estudio es TIMSS; abreviación de Estudio Internacional Sobre las Tendencias en Matemáticas y Ciencias. Desde 1995 TIMSS ha observado los logros de los estudiantes en matemáticas y ciencias en las escuelas del mundo y ha documentado las tendencias mundiales en el conocimiento estudiantil de matemáticas y ciencias.

El resumen adjunto ofrece información de trasfondo de TIMSS, explica lo que implica la participación en el estudio para cada estudiante seleccionado e incluye un número de teléfono y un correo electrónico de contacto donde usted podrá encontrar respuestas a cualquier pregunta que tenga.

{Insert number} de nuestras clases de cuarto grado participarán. {Esta/Una de estas} es la clase de su hijo. {Esta clase/Estas dos clases}, junto con otras {500} clases de estudiantes de cuarto grado en todo el país, contribuirán a mostrar lo que saben los estudiantes de cuarto grado en Estados Unidos sobre matemáticas y ciencias, y cómo se comparan con estudiantes de cuarto grado alrededor del mundo.

Para tener una imagen precisa de lo que los estudiantes de cuarto grado en Estados Unidos pueden hacer, es importante que cada estudiante seleccionado participe en el estudio. Lo invito a que apoye este esfuerzo animando a su hijo a participar; sin embargo, la participación en este estudio es completamente voluntaria. Las experiencias anteriores parecen indicar que los estudiantes disfrutaban de su participación. Además, los estudiantes que participen recibirán un pequeño regalo que creemos les gustará.

Toda la información que se reúna es completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Por ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

Si tiene alguna objeción en que su hijo participe en las actividades de TIMSS, por favor háganoslo saber al completar el formulario adjunto ('Participación en TIMSS') y enviarlo a la escuela lo antes posible.

Gracias por tomarse el tiempo de considerar este estudio. Reciba nuestros mejores deseos.

Atentamente,

Se adjuntan los siguientes documentos:

- Información sobre TIMSS para los padres
- Participación en TIMSS

TIMSS Implicit Consent Form

Participación en TIMSS

Nos encantaría que su hijo participara en el proyecto TIMSS junto con sus compañeros de clase. La participación de los estudiantes en TIMSS es sumamente importante para el éxito del estudio y en última instancia para los intereses del país de mejorar la educación en matemáticas y ciencias. Su hijo será incluido en TIMSS a menos que usted indique lo contrario. Si no desea que su hijo participe, por favor marque la casilla "No" a continuación, firme el formulario y envíelo a la escuela. La escuela se asegurará que su hijo realice otra actividad en el tiempo en que los demás estudiantes estén participando en TIMSS.

No, no deseo que mi hijo participe en el estudio.

Nombre del niño: _____
Nombre completo Apellido

Firma del padre o madre o guardián

Fecha

Gracias por tomarse el tiempo de considerar este importante proyecto.

Exhibit C--8. TIMSS 2011 Fourth-Grade Explicit Consent Letter

Sample Explicit Consent Letter, TIMSS Grade 4

SCHOOL LETTERHEAD

Dear Parent or Guardian,

Our school has accepted an invitation from the National Center for Education Statistics (NCES), U.S. Department of Education, to participate in an important international study of student learning. This study is called TIMSS for short; the full name is the Trends in International Mathematics and Science Study. TIMSS looks at student mathematics and science achievement in schools around the world and documents worldwide trends in student knowledge of mathematics and science since 1995.

The enclosed summary sheet provides some background to TIMSS, explains what is involved for each student selected to participate in the study, and gives a contact phone number and email address where you can find answers to any questions you might have.

{Insert number} of our 4th-grade classes will take part. {This/One of these} is your child's class. {This class/These two classes}, along with some {500} other classes of 4th graders nationwide, will contribute to this picture of what U.S. 4th graders know about mathematics and science, and how they compare with 4th graders worldwide.

To have an accurate picture of what U.S. 4th graders can do, it is important that each student selected take part in the study. I urge you to support this effort by encouraging your child to take part; however, participation in this study is entirely voluntary. Previous experience suggests that students actually enjoy taking part. And participating students will receive a small gift, which we think they will like.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

Before we can allow your child to join in the TIMSS activities we must have your written consent. You can let us know by completing the attached form ('Being Part of TIMSS') and returning it to the school by {Insert date at least 2 days prior to assessment date}.

Thank you for taking the time to think about this. We wish you all the best.

Sincerely,

Enclosures:

Facts About TIMSS for Parents
Being Part of TIMSS

TIMSS Explicit Consent Form

Being Part of TIMSS

We need your consent.

We would like very much to have your child take part in the TIMSS project along with his/her classmates. Student participation in TIMSS is critical to the success of the study and, ultimately, to the nation's interests in improving mathematics and science education. Please check the "Yes" box below if you give your consent, or check the "No" box if you do not consent. If you do not want your child to participate, the school will make arrangements for your child to undertake some other activities during the time that the other students are involved with TIMSS. After making your selection, please sign the form and send it back to the school by {Insert date at least 2 days prior to assessment date}.

☐ Yes, my child may take part in TIMSS.

☐ No, I do not want my child to take part in the study.

Child's Name: _____
First Middle Last

Parent's or Guardian's Signature

Date

Thank you for taking the time to think about this very important project

Exhibit C--8. TIMSS 2011 Fourth-Grade Explicit Consent Letter - Continued

Sample Explicit Consent Letter, TIMSS Grade 4

SCHOOL LETTERHEAD

Estimado padre/madre o tutor,

Nuestra escuela ha aceptado una invitación del Centro Nacional de Estadísticas de la Educación (NCES, por sus siglas en inglés) del Departamento de Educación de Estados Unidos para participar en un importante estudio internacional sobre el aprendizaje estudiantil. El nombre corto de este estudio es TIMSS; abreviación de Estudio Internacional Sobre las Tendencias en Matemáticas y Ciencias. Desde 1995 TIMSS ha observado los logros de los estudiantes en matemáticas y ciencias en las escuelas del mundo y ha documentado las tendencias mundiales en el conocimiento estudiantil de matemáticas y ciencias.

El resumen adjunto ofrece información de trasfondo de TIMSS, explica lo que implica la participación en el estudio para cada estudiante seleccionado e incluye un número de teléfono y un correo electrónico de contacto donde usted podrá encontrar respuestas a cualquier pregunta que tenga.

{Insert number} de nuestras clases de cuarto grado participarán. {Esta/Una de estas} es la clase de su hijo. {Esta clase/Estas dos clases}, junto con otras {500} clases de estudiantes de cuarto grado en todo el país, contribuirán a mostrar lo que saben los estudiantes de cuarto grado en Estados Unidos sobre matemáticas y ciencias, y cómo se comparan con estudiantes de cuarto grado alrededor del mundo.

Para tener una imagen precisa de lo que los estudiantes de cuarto grado en Estados Unidos pueden hacer, es importante que cada estudiante seleccionado participe en el estudio. Lo invito a que apoye este esfuerzo animando a su hijo a participar; sin embargo, la participación en este estudio es completamente voluntaria. Las experiencias anteriores parecen indicar que los estudiantes disfrutan de su participación. Además, los estudiantes que participen recibirán un pequeño regalo que creemos les gustará.

Toda la información que se reúna es completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Por ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

Antes de que podamos permitirle al niño participar en las actividades de TIMSS, debemos tener su autorización por escrito. Puede dejármolo saber completando el formulario que se adjunta ('Participación en TIMSS') y enviándolo a la escuela antes de {Insert date at least 2 days prior to assessment date}.

Gracias por tomarse el tiempo de considerar este estudio. Reciba nuestros mejores deseos.

Atentamente,

Se adjuntan los siguientes documentos:
Información sobre TIMSS para los padres
Participación en TIMSS

TIMSS Explicit Consent Form

Participación en TIMSS

Necesitamos su autorización.

Nos encantaría que su hijo participara en el proyecto TIMSS junto con sus compañeros de clase. La participación de los estudiantes en TIMSS es sumamente importante para el éxito del estudio y en última instancia para los intereses del país de mejorar la educación en matemáticas y ciencias. Por favor marque "Sí" a continuación si da su autorización, o marque "No" si no la da. Si usted no desea que su hijo participe, la escuela se asegurará que su hijo realice otra actividad en el tiempo en que los demás estudiantes estén participando en TIMSS. Después de marcar su elección, por favor firme el formulario y envíelo a la escuela antes de {Insert date at least 2 days prior to assessment date}.

☐ Sí, mi hijo puede participar en TIMSS.

☐ No, no deseo que mi hijo participe en el estudio.

Nombre del niño: _____
Nombre completo Apellido

Gracias por tomarse el tiempo de considerar este importante proyecto.

Facts About TIMSS for Parents

In April and May of this year, your child's school will join schools across the U.S. and around the world taking part in TIMSS, the Trends in International Mathematics and Science Study. The schools were selected randomly to represent the nation's schools, and within each school, 4th-grade students were selected randomly to represent the nation's 4th graders. Your child is among the 4th graders selected from this school to take part in TIMSS.

What is TIMSS?

TIMSS is an international assessment that measures student learning in mathematics and science. Periodically (1995, 2003, 2007, and now 2011) TIMSS documents worldwide trends in the knowledge of 4th graders. The National Center for Education Statistics within the U.S. Department of Education sponsors U.S. participation in TIMSS. Along with more than 60 other nations, we will take part in the 2011 cycle just as we did in 1995, 2003, and 2007. Participation in this study is voluntary.

What is involved?

From April through May 2011, TIMSS staff will visit the school and administer an assessment that contains mathematics and science items. The assessment runs for 70 minutes with breaks between sections. Students will also receive a background questionnaire, which takes 20 to 30 minutes to complete.

What are the benefits?

The nation as a whole benefits from the contribution your child's school makes to the national picture of what our 4th graders know about mathematics and science, and how they compare with 4th graders worldwide. Schools benefit too since we provide each school with a report about how it did in the assessment. Last, and certainly not least, students receive a small gift that we believe they will like.

Who administers TIMSS?

The entire assessment is administered by trained staff from Westat, a research organization under contract to the U.S. Department of Education's National Center for Education Statistics.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

Where can I find out more about TIMSS?

There is a lot of information available through the TIMSS website at <http://nces.ed.gov/timss/> or <http://timss.bc.edu/>. Or, if you would like to contact a TIMSS staff member directly, please feel free to call the TIMSS hotline at 1 (888) 369-5033 or email us at TIMSS-PIRLS@westat.com.

Información sobre TIMSS para los padres

En abril y mayo de este año, la escuela de su niño participará junto con otras escuelas de Estados Unidos y de todo el mundo en el Estudio Internacional Sobre las Tendencias en Matemáticas y Ciencias, TIMSS, por sus siglas en inglés. Las escuelas fueron seleccionadas al azar para representar a las escuelas de nuestro país, y dentro de cada escuela, se seleccionaron al azar a estudiantes de cuarto grado para representar a los estudiantes de cuarto grado del país. Su niño es uno de los estudiantes de cuarto grado seleccionados de esta escuela para participar en TIMSS.

¿Qué es TIMSS?

TIMSS es una evaluación internacional que mide el aprendizaje de los estudiantes en matemáticas y ciencias. TIMSS documenta periódicamente (1995, 2003, 2007 y ahora en 2011) las tendencias mundiales en el conocimiento de los estudiantes de cuarto grado. El Centro Nacional de Estadísticas de la Educación dentro del Departamento de Educación de Estados Unidos patrocina la participación de Estados Unidos en TIMSS. Junto con más de 60 países, participaremos en el ciclo del 2011 tal como lo hicimos en 1995, 2003 y en el 2007. La participación en este estudio es voluntaria.

¿Qué implica?

Desde abril hasta mayo de 2011, el personal de TIMSS visitará la escuela y administrará una evaluación que contiene temas de lectura. La evaluación dura 70 minutos y tiene descansos entre las secciones. A los estudiantes también se les dará un cuestionario sobre información general, que toma de 20 a 30 minutos para responder.

¿Cuáles son los beneficios?

El país en conjunto se beneficia de la contribución que la escuela del niño hace para crear una imagen del país sobre lo que los estudiantes de cuarto grado saben de matemáticas y ciencias y cómo se comparan con los estudiantes de cuarto grado a nivel mundial. Las escuelas también se benefician ya que a cada una le damos un informe sobre cuál fue su desempeño en la prueba. Finalmente, los estudiantes reciben un pequeño regalo que creemos les gustará.

¿Quién administra TIMSS?

La totalidad de la evaluación la administra personal capacitado de Westat, una compañía de estudios de investigación que tiene un contrato con el Centro Nacional de Estadísticas de la Educación del Departamento de Educación de Estados Unidos.

Toda la información que se reúna será completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Bajo esa ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que

permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

¿Dónde puedo obtener más información sobre TIMSS?

Hay bastante información disponible en la página en Internet de TIMSS en <http://nces.ed.gov/timss/> o <http://timss.bc.edu/>. Si prefiere comunicarse con un empleado de TIMSS directamente, no dude en llamar a la línea de información de TIMSS al 1 (888) 369-5033 o enviarnos un correo electrónico a TIMSS-PIRLS@westat.com.

Exhibit C--10. PIRLS 2011 Notification Letter

Sample Notification Letter, PIRLS Grade 4

SCHOOL LETTERHEAD

Dear Parent or Guardian,

Our school has accepted an invitation from the National Center for Education Statistics (NCES), U.S. Department of Education, to participate in an important international study of student learning. This study is called PIRLS for short; the full name is the Progress in International Reading Literacy Study. PIRLS looks at student reading achievement in schools around the world and, every five years since 2001, documents worldwide trends in reading literacy.

The enclosed summary sheet provides some background to PIRLS, explains what is involved for each student selected to participate in the study, and gives a contact phone number and email address where you can find answers to any questions you might have.

{Insert number} of our 4th-grade classes will take part in PIRLS. {This/One of these} is your child's class. {This class/These classes}, along with some {500} other classes of 4th graders nationwide, will contribute to this picture of the reading achievement of U.S. 4th graders, and how they compare with 4th graders worldwide.

To have an accurate picture of what U.S. 4th graders can do, it is important that each student selected take part in the study. I urge you to support this effort by encouraging your child to take part; however, participation in this study is entirely voluntary. Previous experience suggests that students actually enjoy taking part, and participating students will receive a small gift, which we think they will like.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

Thank you for taking the time to think about this. We wish you all the best.

Sincerely,

Enclosures:

Exhibit C--10. PIRLS 2011 Notification Letter - Continued

Sample Notification Letter, PIRLS Grade 4

SCHOOL LETTERHEAD

Estimado padre/madre o tutor,

Nuestra escuela ha aceptado una invitación del Centro Nacional de Estadísticas de la Educación (NCES, por sus siglas en inglés) del Departamento de Educación de Estados Unidos para participar en un importante estudio internacional sobre el aprendizaje estudiantil. El nombre corto de este estudio es PIRLS; abreviación de Estudio Internacional Sobre el Progreso en el Aprendizaje de la Lectura. Desde 2001 PIRLS ha observado los logros de los estudiantes en lectura en las escuelas del mundo y cada cinco años documenta las tendencias mundiales en el aprendizaje de la lectura.

El resumen adjunto ofrece información de trasfondo de PIRLS, explica lo que implica la participación en el estudio para cada estudiante seleccionado e incluye un número de teléfono y un correo electrónico de contacto donde usted podrá encontrar respuestas a cualquier pregunta que tenga.

{Insert number} de nuestras clases de cuarto grado participarán. {Esta/Una de estas} es la clase de su hijo. {Esta clase/Estas dos clases}, junto con otras {500} clases de estudiantes de cuarto grado en todo el país, contribuirán a mostrar los logros en lectura de los estudiantes de cuarto grado en Estados Unidos, y cómo se comparan con estudiantes de cuarto grado alrededor del mundo.

Para tener una imagen precisa de lo que los estudiantes de cuarto grado en Estados Unidos pueden hacer, es importante que cada estudiante seleccionado participe en el estudio. Lo invito a que apoye este esfuerzo animando a su hijo a participar; sin embargo, la participación en este estudio es completamente voluntaria. Las experiencias anteriores parecen indicar que los estudiantes disfrutan de su participación. Además, los estudiantes que participen recibirán un pequeño regalo que creemos les gustará.

Toda la información que se reúna es completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Por ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

Gracias por tomarse el tiempo de considerar este estudio. Reciba nuestros mejores deseos.

Atentamente,

Se adjuntan los siguientes documentos:
Información sobre PIRLS para los padres

Exhibit C--11. PIRLS 2011 Implicit Consent Letter

Sample Implicit Consent Letter, PIRLS Grade 4

SCHOOL LETTERHEAD

Dear Parent or Guardian,

Our school has accepted an invitation from the National Center for Education Statistics (NCES), U.S. Department of Education, to participate in an important international study of student learning. This study is called PIRLS for short; the full name is the Progress in International Reading Literacy Study. PIRLS looks at student reading achievement in schools around the world and, every five years since 2001, documents worldwide trends in reading literacy.

The enclosed summary sheet provides some background to PIRLS, explains what is involved for each student selected to participate in the study, and gives a contact phone number and email address where you can find answers to any questions you might have.

{Insert number} of our 4th-grade classes will take part. {This/One of these} is your child's class. {This class/These classes}, along with some {500} other classes of 4th graders nationwide, will contribute to this picture of the reading achievement of U.S. 4th graders, and how they compare with 4th graders worldwide.

To have an accurate picture of what U.S. 4th graders can do, it is important that each student selected take part in the study. I urge you to support this effort by encouraging your child to take part; however, participation in this study is entirely voluntary. Previous experience suggests that students actually enjoy taking part, and participating students will receive a small gift, which we think they will like.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

If you have any objection to your child joining in the PIRLS activities please let us know by completing the attached form ('Being Part of PIRLS') and returning it to the school.

Thank you for taking the time to think about this. We wish you all the best.

Enclosures:

Facts About PIRLS for Parents

PIRLS Implicit Consent Form

Being Part of PIRLS

We would like very much to have your child take part in the PIRLS project along with his/her classmates. Student participation in PIRLS is critical to the success of the study and, ultimately, to the nation's interests in improving reading education. Your child will be included in PIRLS unless you indicate otherwise.

If you do not want your child to participate in PIRLS, please check the "No" box below, sign the form, and send it back to the school. The school will make arrangements for your child to undertake some other activities during the time that the other students are involved with PIRLS.

☐

No, I do not want my child to take part in the study.

Child's Name: _____
First Middle Last

Parent's or Guardian's Signature

Date

Thank you for taking the time to think about this very important project.

Sample Implicit Consent Letter, PIRLS Grade 4

SCHOOL LETTERHEAD

Estimado padre/madre o tutor,

Nuestra escuela ha aceptado una invitación del Centro Nacional de Estadísticas de la Educación (NCES, por sus siglas en inglés) del Departamento de Educación de Estados Unidos para participar en un importante estudio internacional sobre el aprendizaje estudiantil. El nombre corto de este estudio es PIRLS; abreviación de Estudio Internacional Sobre el Progreso en el Aprendizaje de la Lectura. Desde 2001 PIRLS ha observado los logros de los estudiantes en lectura en las escuelas del mundo y cada cinco años documenta las tendencias mundiales en el aprendizaje de la lectura.

El resumen adjunto ofrece información de trasfondo de PIRLS, explica lo que implica la participación en el estudio para cada estudiante seleccionado e incluye un número de teléfono y un correo electrónico de contacto donde usted podrá encontrar respuestas a cualquier pregunta que tenga.

{Insert number} de nuestras clases de cuarto grado participarán. {Esta/Una de estas} es la clase de su hijo. {Esta clase/Estas dos clases}, junto con otras {500} clases de estudiantes de cuarto grado en todo el país, contribuirán a mostrar los logros en lectura de los estudiantes de cuarto grado en Estados Unidos, y cómo se comparan con estudiantes de cuarto grado alrededor del mundo.

Para tener una imagen precisa de lo que los estudiantes de cuarto grado en Estados Unidos pueden hacer, es importante que cada estudiante seleccionado participe en el estudio. Lo invito a que apoye este esfuerzo animando a su hijo a participar; sin embargo, la participación en este estudio es completamente voluntaria. Las experiencias anteriores parecen indicar que los estudiantes disfrutaron de su participación. Además, los estudiantes que participen recibirán un pequeño regalo que creemos les gustará.

Toda la información que se reúna es completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Por ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

Si tiene alguna objeción en que su hijo participe en las actividades de PIRLS, por favor háganoslo saber al completar el formulario adjunto ('Participación en PIRLS') y enviarlo a la escuela lo antes posible.

Gracias por tomarse el tiempo de considerar este estudio. Reciba nuestros mejores deseos.

Atentamente,

Se adjuntan los siguientes documentos:

- Información sobre PIRLS para los padres
- Participación en PIRLS

PIRLS Implicit Consent Form

Participación en PIRLS

Nos encantaría que su hijo participara en el proyecto PIRLS junto con sus compañeros de clase. La participación de los estudiantes en PIRLS es sumamente importante para el éxito del estudio y en última instancia para los intereses del país de mejorar la educación en lectura. Su hijo será incluido en PIRLS a menos que usted indique lo contrario.

Si no desea que su hijo participe, por favor marque la casilla "No" a continuación, firme el formulario y envíelo a la escuela. La escuela se asegurará que su hijo realice otra actividad en el tiempo en que los demás estudiantes estén participando en PIRLS.

☐

No, no deseo que mi hijo participe en el estudio.

Nombre del niño: _____
Nombre completo Apellido

Firma del padre o madre o guardián

Fecha

Gracias por tomarse el tiempo de considerar este importante proyecto.

Exhibit C--12. PIRLS 2011 Explicit Consent Letter

Sample Explicit Consent Letter, PIRLS Grade 4

SCHOOL LETTERHEAD

Dear Parent or Guardian,

Our school has accepted an invitation from the National Center for Education Statistics (NCES), U.S. Department of Education, to participate in an important international study of student learning. This study is called PIRLS for short; the full name is the Progress in International Reading Literacy Study. PIRLS looks at student reading achievement in schools around the world and, every five years since 2001, documents worldwide trends in reading literacy.

The enclosed summary sheet provides some background to PIRLS, explains what is involved for each student selected to participate in the study, and gives a contact phone number and email address where you can find answers to any questions you might have.

{Insert number} of our 4th-grade classes will take part. {This/One of these} is your child's class. {This class/These two classes}, along with some {500} other classes of 4th graders nationwide, will contribute to this picture of the reading achievement of U.S. 4th graders, and how they compare with 4th graders worldwide.

To have an accurate picture of what U.S. 4th graders can do, it is important that each student selected take part in the study. I urge you to support this effort by encouraging your child to take part; however, participation in this study is entirely voluntary. Previous experience suggests that students actually enjoy taking part, and participating students will receive a small gift, which we think they will like.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

Before we can allow your child to join in the PIRLS activities we must have your written consent. You can let us know by completing the attached form ('Being Part of PIRLS') and returning it to the school.

Thank you for taking the time to think about this. We wish you all the best.

Sincerely,

Enclosures:
Facts About PIRLS for Parents

PIRLS Explicit Consent Form

Being Part of PIRLS

We need your consent.

We would like very much to have your child take part in the PIRLS project along with his/her classmates. Student participation in PIRLS is critical to the success of the study and, ultimately, to the nation's interests in improving reading education. Please check the "Yes" box below if you give your consent, or check the "No" box if you do not consent. If you do not want your child to participate, the school will make arrangements for your child to undertake some other activities during the time that the other students are involved with PIRLS. After making your selection, please sign the form and send it back to the school by {Insert date at least 2 days prior to assessment date}.

☐ Yes, my child may take part in PIRLS.

☐ No, I do not want my child to take part in the study.

Child's Name: _____
First Middle Last

Parent's or Guardian's Signature

Date

Thank you for taking the time to think about this very important project.

Sample Explicit Consent Letter, PIRLS Grade 4

SCHOOL LETTERHEAD

Estimado padre/madre o tutor,

Nuestra escuela ha aceptado una invitación del Centro Nacional de Estadísticas de la Educación (NCES, por sus siglas en inglés) del Departamento de Educación de Estados Unidos para participar en un importante estudio internacional sobre el aprendizaje estudiantil. El nombre corto de este estudio es PIRLS; abreviación de Estudio Internacional Sobre el Progreso en el Aprendizaje de la Lectura. Desde 2001 PIRLS ha observado los logros de los estudiantes en lectura en las escuelas del mundo y cada cinco años documenta las tendencias mundiales en el aprendizaje de la lectura.

El resumen adjunto ofrece información de trasfondo de PIRLS, explica lo que implica la participación en el estudio para cada estudiante seleccionado e incluye un número de teléfono y un correo electrónico de contacto donde usted podrá encontrar respuestas a cualquier pregunta que tenga.

{Insert number} de nuestras clases de cuarto grado participarán. {Esta/Una de estas} es la clase de su hijo. {Esta clase/Estas dos clases}, junto con otras {500} clases de estudiantes de cuarto grado en todo el país, contribuirán a mostrar los logros en lectura de los estudiantes de cuarto grado en Estados Unidos, y cómo se comparan con estudiantes de cuarto grado alrededor del mundo.

Para tener una imagen precisa de lo que los estudiantes de cuarto grado en Estados Unidos pueden hacer, es importante que cada estudiante seleccionado participe en el estudio. Lo invito a que apoye este esfuerzo animando a su hijo a participar; sin embargo, la participación en este estudio es completamente voluntaria. Las experiencias anteriores parecen indicar que los estudiantes disfrutaron de su participación. Además, los estudiantes que participen recibirán un pequeño regalo que creemos les gustará.

Toda la información que se reúna es completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Por ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

Antes de que podamos permitirle al niño participar en las actividades de PIRLS, debemos tener su autorización por escrito. Puede dejárnoslo saber completando el formulario que se adjunta ('Participación en PIRLS') y enviándolo a la escuela.

Gracias por tomarse el tiempo de considerar este estudio. Reciba nuestros mejores deseos.

Atentamente,

Se adjuntan los siguientes documentos:
Información sobre PIRLS para los padres
Participación en PIRLS

PIRLS Explicit Consent Form

Participación en PIRLS

Necesitamos su autorización.

Nos encantaría que su hijo participara en el proyecto PIRLS junto con sus compañeros de clase. La participación de los estudiantes en PIRLS es sumamente importante para el éxito del estudio y en última instancia para los intereses del país de mejorar la educación en lectura. Por favor marque "Sí" a continuación si da su autorización, o marque "No" si no la da. Si usted no desea que su hijo participe, la escuela se asegurará que su hijo realice otra actividad en el tiempo en que los demás estudiantes estén participando en PIRLS. Después de marcar su elección, por favor firme el formulario y envíelo a la escuela antes de {Insert date at least 2 days prior to assessment date}.

☐

Sí, mi hijo puede participar en PIRLS.

☐

No, no deseo que mi hijo participe en el estudio.

Nombre del niño: _____
Nombre completo Apellido

Firma del padre o madre o guardián

Fecha

Gracias por tomarse el tiempo de considerar este importante proyecto.

Main study's 'Facts About PIRLS for Parents' – Grade 4

Facts About PIRLS for Parents

In April and May of this year, your child's school will join schools across the U.S. and around the world taking part in PIRLS, the Progress in International Reading Literacy Study. The schools in the United States were selected randomly to represent our nation's schools, and within each school, 4th-grade students were selected randomly to represent the nation's 4th graders. Your child is among the 4th graders selected from this school to take part in PIRLS.

What is PIRLS?

PIRLS is an international assessment that measures student achievement in reading. Periodically (2001, 2006, and now 2011) PIRLS documents worldwide trends in the knowledge of 4th graders. The National Center for Education Statistics within the U.S. Department of Education sponsors U.S. participation in PIRLS. Along with more than 50 other nations, we will take part in the 2011 cycle just as we did in 2001 and 2006. Participation in this study is voluntary.

What is involved?

From April through May 2011, PIRLS staff will visit the school and administer an assessment that contains reading items. The assessment runs for 70 minutes with breaks between sections. Students will also receive a background questionnaire, which takes 20 to 30 minutes to complete.

What are the benefits?

The nation as a whole benefits from the contribution your child's school makes to the national picture of the reading achievement of our 4th graders, and how they compare with 4th graders worldwide. Schools benefit too since we provide each school with a report about how it did in the assessment. Last, and certainly not least, students receive a small gift that we believe they will like.

Who administers PIRLS?

The entire assessment is administered by trained staff from Westat, a research organization under contract to the U.S. Department of Education's National Center for Education Statistics.

Where can I find out more about PIRLS?

There is a lot of information available through the PIRLS website at <http://nces.ed.gov/surveys/PIRLS>. Or, if you would like to contact a PIRLS staff member directly, please feel free to call the PIRLS hotline at 1 (888) 369-5033 or email us at TIMSS-PIRLS@westat.com.

Main study's 'Facts About PIRLS for Parents' – Grade 4

Información sobre PIRLS para los padres

En abril y mayo de este año, la escuela de su niño participará junto con otras escuelas de Estados Unidos y de todo el mundo en el Estudio Internacional Sobre el Progreso en el Aprendizaje de la Lectura, PIRLS, por sus siglas en inglés. Las escuelas fueron seleccionadas al azar para representar a las escuelas de nuestro país, y dentro de cada escuela, se seleccionaron al azar a estudiantes de cuarto grado para representar a los estudiantes de cuarto grado del país. Su niño es uno de los estudiantes de cuarto grado seleccionados de esta escuela para participar en PIRLS.

¿Qué es PIRLS?

PIRLS es una evaluación internacional que mide el aprendizaje de los estudiantes en lectura. PIRLS documenta periódicamente (2001, 2006 y ahora en 2011) las tendencias mundiales en el conocimiento de los estudiantes de cuarto grado. El Centro Nacional de Estadísticas de la Educación dentro del Departamento de Educación de Estados Unidos patrocina la participación de Estados Unidos en PIRLS. Junto con más de 50 países, participaremos en el ciclo del 2011 tal como lo hicimos en el 2001 y en el 2006. La participación en este estudio es voluntaria.

¿Qué implica?

Desde abril hasta mayo de 2011, el personal de PIRLS visitará la escuela y administrará una evaluación que contiene temas de lectura. La evaluación dura 70 minutos y tiene descansos entre las secciones. A los estudiantes también se les dará un cuestionario sobre información general, que toma de 20 a 30 minutos para responder.

¿Cuáles son los beneficios?

El país en conjunto se beneficia de la contribución que la escuela del niño hace para crear una imagen del país sobre lo que los estudiantes de cuarto grado saben de lectura y cómo se comparan con los estudiantes de cuarto grado a nivel mundial. Las escuelas también se benefician ya que a cada una le damos un informe sobre cuál fue su desempeño en la prueba. Finalmente, los estudiantes reciben un pequeño regalo que creemos les gustará.

¿Quién administra PIRLS?

La totalidad de la evaluación la administra personal capacitado de Westat, una compañía de estudios de investigación que tiene un contrato con el Centro Nacional de Estadísticas de la Educación del Departamento de Educación de Estados Unidos.

Toda la información que se reúna será completamente confidencial, como lo exige la ley. NCES está autorizado a realizar este estudio de acuerdo con la Ley de reforma de ciencias de la educación de 2002 (Ley pública 107-279, sección 153). Bajo esa ley, la información dada por las escuelas, empleados y estudiantes solamente se puede utilizar con fines estadísticos y no se puede dar a conocer ni utilizar de una manera que

permita la identificación de personas para otros fines (Ley pública 107-279, sección 183 y título V, subtítulo A de la Ley de gobierno electrónico de 2002 (Ley pública 107-347)). En los informes nunca se identifica ni a los estudiantes ni a las escuelas. Todas las estadísticas publicadas se refieren a Estados Unidos en conjunto.

¿Dónde puedo obtener más información sobre PIRLS?

Hay bastante información disponible en la página en Internet de PIRLS en <http://nces.ed.gov/surveys/pirls/>. Si prefiere comunicarse con un empleado de PIRLS directamente, no dude en llamar a la línea de información de PIRLS al 1 (888) 369-5033 o enviarnos un correo electrónico a TIMSSS-PIRLS@westat.com.

Exhibit C--14. TIMSS 2011 Eighth-Grade Notification Letter

PARENT GUARDIAN NOTIFICATION LETTER TIMSS 2011 Grade 8

Dear Parent or Guardian,

Our school has accepted an invitation to participate in an important assessment that will allow us to compare the mathematics and science performance of students in our state to students worldwide. The Trends in International Mathematics and Science Study (TIMSS) is conducted by the National Center for Education Statistics (NCES) within the U.S. Department of Education. TIMSS has documented student achievement worldwide in mathematics and science every four years since 1995, and this year a special study will be conducted to link TIMSS and the National Assessment of Educational Progress (NAEP).

NAEP is also conducted by NCES and is the largest continuing and nationally representative assessment of what our nation's students can do in key subject areas such as mathematics, reading, science, and writing. Some students may be answering some NAEP questions during the TIMSS assessment. To access released NAEP questions, please visit the NAEP Questions Tool at <http://nces.ed.gov/nationsreportcard/itmrlsx/default.aspx>.

The enclosed summary sheet provides some background to TIMSS, explains what is involved for each student selected to participate, and gives a contact phone number and e-mail address where you can find answers to any questions you might have.

(Insert number) of our 8th-grade classes will take part in TIMSS on (insert assessment date). (This/One of these) is your child's class. (This class/These two classes), along with some 1,200 other classes of 8th-graders nationwide, will contribute to an understanding of what U.S. 8th-graders know about mathematics and science and how they compare with 8th-graders worldwide.

It is important that each student selected participates in the assessment to provide the most accurate report of what our students know and can do. The results are completely confidential, and your child's grade will not be affected. Your child may be excused from participation for any reason, is not required to finish the assessment, and may skip any test question. While TIMSS is voluntary, the results from this assessment will inform improvements in education and will allow states to compare their educational achievement in mathematics and science internationally. **Your child will represent many other students, so participation is very important.** However, if you do not want your child to participate, please notify me in writing by (date).

NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 9543). Under that law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 9573 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to the United States as a whole.

We are excited that our school will be participating in TIMSS, and we are pleased that your child has been selected. **We know that (school name)'s students will help us to show what our nation's students know and can do.**

Sincerely,

Principal

Enclosure:
Facts About TIMSS for Parents

Exhibit C--14. TIMSS 2011 Eighth-Grade Notification Letter - Continued

CARTA DE NOTIFICACIÓN PARA LOS PADRES O TUTORES

TIMSS 2011 Grade 8

Estimado(a) padre o madre o tutor:

Nuestra escuela ha aceptado una invitación para participar en una importante evaluación que nos permitirá comparar el desempeño de los estudiantes de nuestro estado con estudiantes de todo el mundo en matemáticas y ciencias. El Estudio de las Tendencias Internacionales de Matemática y Ciencias (TIMSS, por sus siglas en inglés) lo lleva a cabo el Centro Nacional para Estadísticas de la Educación (NCES, por sus siglas en inglés) dentro del Departamento de Educación de Estados Unidos. TIMSS ha documentado los logros de los estudiantes en matemáticas y ciencias en todo el mundo cada cuatro años desde 1995, y este año se llevará a cabo un estudio especial para relacionar TIMSS y la Evaluación Nacional de Progreso Educativo (NAEP, por sus siglas en inglés).

NAEP también la lleva a cabo NCES y es la evaluación continua y nacionalmente representativa más grande que muestra lo que los estudiantes en toda la nación saben y pueden hacer en el área de las materias fundamentales como matemáticas, lectura, ciencias y escritura. Algunos estudiantes responderán algunas preguntas de NAEP durante la evaluación de TIMSS. Para ver las preguntas publicadas de NAEP, por favor visite NAEP "Questions Tool" en <http://nces.ed.gov/nationsreportcard/itmrlsx>.

La hoja de resumen que se adjunta proporciona alguna información sobre TIMSS, explica lo que implica participar para cada estudiante seleccionado para participar y da un número de teléfono de contacto y una dirección de correo electrónico (e-mail) donde usted puede encontrar respuestas a cualquier pregunta que tenga.

(Insert number) de nuestras clases de 8º grado participarán en la evaluación de TIMSS el (insert assessment date). (Esta/Una de estas) es la clase de su hijo(a). (Esta clase/Estas dos clases), junto con otras 1,200 clases de estudiantes de 8º grado en toda la nación, contribuirá(n) a una comprensión de lo que los estudiantes de 8º grado en Estados Unidos saben acerca de matemáticas y ciencias y cómo se comparan con los estudiantes de 8º grado de todo el mundo.

Es importante que cada estudiante seleccionado participe en la evaluación para proporcionar el informe más preciso posible de lo que los estudiantes saben y pueden hacer. Los resultados son completamente confidenciales, y no afectarán las notas de su hijo(a). Su hijo(a) puede ser excusado(a) de participar por cualquier motivo, no está obligado(a) a terminar la evaluación y puede dejar de responder cualquier pregunta de la prueba. Aunque TIMSS es voluntaria, los resultados de esta evaluación se tendrán en cuenta en el momento de efectuar mejoras en la educación y les permitirán a los estados comparar sus logros educativos en matemáticas y ciencias internacionalmente. **Su hijo(a) representará a muchos otros estudiantes, de manera que la participación es muy importante.** Sin embargo, si usted no quiere que su hijo(a) participe, por favor notifíqueme por escrito antes del (date).

NCES está autorizado bajo la Ley de Reforma de Ciencias de la Educación de 2002 (Ley Pública 107-279, Sección 9543) para llevar a cabo este estudio. Bajo esa ley, la información proporcionada por las escuelas, el personal y los estudiantes se puede usar solamente para propósitos estadísticos y no se puede publicar o usar de manera que pueda identificar a alguien para cualquier otro propósito (Ley Pública 107-279, Sección 9573 y Título V, subtítulo A de la Ley de Gobierno Electrónico de 2002 (Ley Pública 107-347)). Los estudiantes y las escuelas nunca se identifican en ningún informe. Todas las estadísticas que se informan se refieren a Estados Unidos en conjunto.

Estamos muy entusiasmados de que nuestra escuela participe en TIMSS y nos agrada que su hijo(a) haya sido seleccionado(a). **Sabemos que los estudiantes de (school name) nos ayudarán a mostrar lo que los estudiantes de nuestra nación saben y pueden hacer.**

Atentamente,

Director(a)

Se adjunta documento
Información para los padres acerca de TIMSS

Facts About TIMSS for Parents

In April and May of this year, your child's school will join schools across the United States and around the world taking part in TIMSS, the Trends in International Mathematics and Science Study. The schools were selected randomly to represent the nation's schools, and within each school, 8th-grade students were selected randomly to represent the nation's 8th-graders. Your child is among the 8th-graders selected from this school to take part in TIMSS.

What is TIMSS?

TIMSS is an international assessment that measures student learning in mathematics and science. Every four years since 1995, TIMSS documents worldwide trends in the knowledge of 8th-graders. The National Center for Education Statistics within the U.S. Department of Education sponsors U.S. participation in TIMSS. Along with more than 60 other nations, the U.S. will take part in the 2011 cycle just as we did in 1995, 1999, 2003, and 2007. Participation in this study is voluntary.

What is involved?

From April through May 2011, TIMSS staff will visit the school and administer an assessment that contains mathematics and science items. The assessment runs for 90 minutes with breaks between sections. Students will also be asked some questions about themselves and their educational experience in a questionnaire that will take 20 to 30 minutes to complete.

What are the benefits?

The nation as a whole benefits from the contribution your child's school makes to the national picture of what our 8th-graders know about mathematics and science, and how they compare with 8th-graders worldwide. Schools benefit, too, since we provide each school with a report about how it performed in the assessment. Last, and certainly not least, students receive a small gift that we believe they will like.

Who administers TIMSS?

The entire assessment is administered by trained staff from Westat, a research organization under contract to the U.S. Department of Education's National Center for Education Statistics.

All of the information collected is kept completely confidential, as required by law. NCES is authorized to conduct this study under the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed or used in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Students and schools are never identified in any reports. All reported statistics refer to select states and the United States as a whole.

Where can I find out more about TIMSS?

More information is available at the TIMSS website at <http://nces.ed.gov/timss/> or <http://timss.bc.edu/>. Or, if you would like to contact a TIMSS staff member directly, please feel free to call the TIMSS hotline at 888-369-5033 or email us at TIMSS-PIRLS@westat.com.

Información para los padres acerca de TIMSS

En abril y mayo de este año, la escuela de su hijo(a) se unirá a otras escuelas en todo Estados Unidos y alrededor del mundo al tomar parte en TIMSS, el Estudio de las Tendencias Internacionales de Matemática y Ciencias. Las escuelas fueron seleccionadas al azar para representar a las escuelas de la nación, y dentro de cada escuela se seleccionaron estudiantes de 8º grado al azar para representar a los estudiantes de 8º grado de la nación. Su hijo(a) está dentro de los estudiantes de 8º grado seleccionados en esta escuela para participar en TIMSS.

¿Qué es TIMSS?

TIMSS es una evaluación internacional que mide el aprendizaje de los estudiantes en matemáticas y ciencias. Cada cuatro años, desde 1995, TIMSS documenta en todo el mundo las tendencias en el conocimiento de los estudiantes de 8º grado. El Centro Nacional para Estadísticas de la Educación dentro del Departamento de Educación de Estados Unidos auspicia la participación de Estados Unidos en TIMSS. Junto con más de otras 60 naciones, Estados Unidos participará en el ciclo 2011 tal como lo hicimos en 1995, 1999, 2003, y 2007. La participación en este estudio es voluntaria.

¿Qué implica?

Desde abril hasta mayo de 2011, el personal de TIMSS visitará la escuela y administrará una evaluación que contiene preguntas de matemáticas y ciencias. La evaluación dura 90 minutos con descansos entre las secciones. A los estudiantes también se les harán algunas preguntas acerca de sí mismos y de sus experiencias educativas en un cuestionario que tomará 20 a 30 minutos para llenar.

¿Cuáles son los beneficios?

Toda la nación se beneficia de la contribución que la escuela de su hijo(a) hace a la descripción nacional de lo que nuestros estudiantes de 8º grado saben acerca de matemáticas y ciencias, y como se comparan con los estudiantes de 8º grado de todo el mundo. La escuela también se beneficia, ya que a cada escuela le proporcionamos un informe acerca de cómo les fue en la evaluación. Finalmente, y ciertamente no menos importante, los estudiantes reciben un pequeño regalo que creemos que a ellos les gustará.

¿Quién administra TIMSS?

Toda la evaluación es administrada por personal capacitado de Westat, una compañía que hace estudios de investigación bajo contrato con el Centro Nacional para Estadísticas de la Educación del Departamento de Educación de Estados Unidos.

Toda la información que se reúna se mantendrá en completa confidencialidad como lo exige la ley. NCES está autorizado bajo la Ley de Reforma de Ciencias de la Educación de 2002 (Ley Pública 107-279, Sección 153) para llevar a cabo este estudio. Por ley, la información proporcionada por las escuelas, el personal y los estudiantes se puede usar solamente para propósitos estadísticos y no se puede publicar o usar de manera que pueda identificar a alguien para cualquier otro propósito (Ley Pública 107-279, Sección 9573 y Título V, subtítulo A de la Ley de Gobierno Electrónico de 2002 (Ley Pública 107-347)).

Los estudiantes y las escuelas nunca se identifican en ningún informe. Todas las estadísticas que se informan se refieren a Estados Unidos en conjunto.

¿Dónde puedo encontrar más información acerca de TIMSS?

Hay más información disponible en el sitio Web de TIMSS en <http://nces.ed.gov/timss/> o <http://timss.bc.edu/>. Si usted desea comunicarse directamente con un miembro del personal de TIMSS, por favor no demore en llamar a la línea directa al 888-369-5033 o mándenos un correo electrónico (e-mail) a TIMSS-PIRLS@westat.com.

Appendix D. Informational Materials

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Exhibit D-1. TIMSS and PIRLS timeline of activities



Exhibit D-1. TIMSS and PIRLS timeline of activities—Continued

For additional information, go to <http://nces.ed.gov/timss> and <http://nces.ed.gov/surveys/PIRLS>.

TIMELINE OF SCHOOL ACTIVITIES				
	After agreement to participate	Prior to assessment day	Assessment day	Benefits
Principal	<ul style="list-style-type: none">Identifies a school coordinator. The school coordinator works with Westat assessment staff to plan for the assessment.	<ul style="list-style-type: none">Completes a brief School Questionnaire (about the characteristics of the school; its enrollment, resources, policies, and learning environment).Arranges assessment day space.	<ul style="list-style-type: none">Confirms space for assessment is problem-free.If necessary, helps to ensure all sampled students attend the assessment session.	<ul style="list-style-type: none">Receives a \$200 check for the school.Represents other similar U.S. schools.Receives feedback based on the performance of students in your school that took the TIMSS/PIRLS assessment.Receives U.S. national report with final results.
School coordinator	<ul style="list-style-type: none">Works with Westat assessment staff to select an assessment date convenient for the school.	<ul style="list-style-type: none">Completes Class Listing Form and Student Listing Forms and returns these to Westat (via fax, mail, or email).Ensures parents are notified that their children have been selected for the assessment.Works with assessment staff to identify students with special education needs.Meets with students/teachers as necessary to provide information about the study.	<ul style="list-style-type: none">Collects completed School and Teacher Questionnaires and returns them to assessment staff.Ensures all sampled students attend the assessment session.Meets with assessment staff and reviews the assessment.	<ul style="list-style-type: none">Receives a \$100 personal check.Receives U.S. national report with final results.
Teachers of sampled classes	—	<ul style="list-style-type: none">Complete Teacher Questionnaires and returns them to the school coordinator prior to assessment day.	—	<ul style="list-style-type: none">Represent the United States in the international study.
Students	—	—	<ul style="list-style-type: none">Students of the selected classes attend the assessment session and complete the assessment and Student Questionnaire.	<ul style="list-style-type: none">Receive a small thank-you gift.Represent other U.S. students like themselves and contribute to the profile of what American students know.
Westat assessment staff (contracted by the U.S. Department of Education's National Center for Education Statistics to conduct the study and support participating schools)	<ul style="list-style-type: none">Work with the school to set an assessment date.Help school coordinator with assessment details.Protect school and student confidentiality.	<ul style="list-style-type: none">Call the school coordinator to discuss assessment day space and student participation.Select classroom sample and notify school of selected classes.Provide School and Teacher Questionnaires to the school coordinator for distribution.	<ul style="list-style-type: none">Conduct assessment from start to finish.Furnish all the assessment materials, pencils, and test booklets.Conduct a brief followup interview with the school coordinator at the end of the assessment.Maintain security of all materials.	—



What will be asked of the school coordinator?

Upon the school's agreement to participate, Westat staff will work with the school coordinator to:

- Schedule the assessment. A Westat staff member will contact the school coordinator to schedule a convenient date between April 4 and May 27, 2011. The coordinator will need to arrange the use of each selected class' classroom or an alternative quiet space for the assessment.
- Review parent notification procedures. If your school requires parental permission to conduct the assessment(s), the Westat staff member will review these procedures with the school coordinator.
- Provide a list of fourth-grade classes. The school coordinator will receive instructions for preparing and submitting a list of fourth-grade classes. Classes from the list will be selected randomly to participate.
- Provide a student listing for each selected class.
All student names will be kept confidential and will never be linked to assessment booklets or results. Individual student responses or scores are NEVER reported or distributed.

Closer to the assessment date, the school coordinator will be asked to:

- Work with a Westat staff member to identify those students with special needs or limited English proficiency that preclude them from participating in the assessment.

- Notify parents, teachers, and students. Once the classes and students have been selected, a Westat staff member will work with the school coordinator on procedures for notifying parents, teachers, and students of the study and the benefits of participating.
- Receive the School and Teacher Questionnaires. The school coordinator will be mailed the School and Teacher Questionnaires and asked to distribute them to the school principal and teachers of the selected classes. The school coordinator should also retrieve the questionnaires and return them to the Westat staff member on assessment day.
- Confirm the assessment information. At least 2 weeks before the assessment, a Westat staff member will contact the school coordinator to confirm the date and location of the assessment.

On assessment day, the school coordinator will be asked to:

- Ensure that all students in the selected classes attend the assessment session. While it is not necessary for the school coordinator to be present during the session, the school coordinator should be available before the assessment to help locate selected students and ensure participation. **It is very important that student attendance rates be as high as possible** to avoid the need for a makeup session.

A graphic timeline of activities is also available for your convenience.

Please feel free to contact the U.S. TIMSS–PIRLS Home Office with any questions

via email at TIMSS-PIRLS@westat.com

or by calling **1-888-369-5033**



Frequently Asked Questions

Grade 4



What is TIMSS and PIRLS?

TIMSS and PIRLS are international assessments designed to measure trends in mathematics and science achievement (TIMSS) and reading literacy (PIRLS) of fourth-grade students. In 2011, the two studies will be administered simultaneously in participating schools. Up to four classes will be randomly selected to participate, with each class randomly assigned to take either TIMSS or PIRLS.

Why was my school selected for participation?

Schools of varying demographics and locations were randomly selected so that the overall U.S. sample is representative of the overall U.S. school population. The random selection process is important for ensuring that a country's sample accurately reflects its schools and, therefore, can fairly be compared with samples of schools from other countries.

Will all our fourth-graders be asked to participate?

It depends on the number of fourth-grade classrooms in the school. In schools with four or fewer fourth-grade classrooms, all students will be asked to participate. In schools with more than four fourth-grade classrooms, only students in four randomly selected classrooms will be asked to participate.

In addition, some students with special needs or limited English proficiency may be excused from the assessment.

Who conducts the assessment?

The entire assessment process will be undertaken by trained staff from Westat, a research organization under contract to the U.S. Department of Education's National Center for Education Statistics (NCES). NCES conducts this study under authorization in the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). The U.S. Office of Management and Budget has approved the data collection under OMB # 1850-0645.

Do teachers need to help administer the assessment?

No. Westat staff will visit the school on the day of the assessment, bringing with them all the materials required, and they will handle the entire administration of the assessment.

When will the assessment be conducted?

The assessment will be conducted between April 4 and May 27, 2011. Westat will work with schools to identify an assessment date convenient for the school in that time period.

Where will the assessment be conducted?

The assessment will be conducted in the schools that are selected to participate.

How long does the assessment take?

The assessment session is approximately 2½ hours and includes the administration of the assessment, a brief questionnaire that students complete about themselves, and two breaks. The questionnaire takes approximately 30 minutes to complete.

What will happen with the collected data?

The data from the assessment will be used to evaluate how the knowledge and skills of U.S. students compare to those of their peers in other participating countries. By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Reports of the findings from the assessment will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

Are schools required by federal law to participate?

No. School participation is voluntary. However, we hope you will participate in this study so that students like those in your school are accurately and fairly represented.

What do school staff and students do?

- Schools are asked to designate a School Coordinator to assist Westat staff members with in-school arrangements.
- The school principal or lead administrator will receive a School Questionnaire to complete. The questionnaire, which asks about the school environment and structure, takes about 20 minutes to complete.
- Teachers of the sampled fourth-grade classes will receive Teacher Questionnaires to complete. These questionnaires focus on the nature of implemented curricula, instructional practices, and attitudes toward reading, mathematics, and science. They take about 30 minutes to complete.
- Students will attend the assessment session (2½ hours in length) and will be asked to complete the assessment booklet and questionnaire. Those who do will receive a small gift as a thank-you.

Please feel free to contact the U.S. TIMSS–PIRLS Home Office with any questions via email TIMSS-PIRLS@westat.com or by calling 1-888-369-5033.

Exhibit D-4. PIRLS study brochure

Participating countries in PIRLS 2011

North and South America	Ireland	Indonesia
Canada	Italy	Iran, Islamic Rep. of
Colombia	Lithuania	Israel
Honduras	Luxembourg	Kuwait
Trinidad and Tobago	Malta	Mongolia
United States	Netherlands	Oman
	Norway	Qatar
Europe	Poland	Saudi Arabia
Austria	Romania	Singapore
Belgium (French)	Russian Federation	United Arab Emirates
Bosnia and Herzegovina	Scotland	
Bulgaria	Slovak Republic	Africa
Croatia	Slovenia	Botswana
Czech Republic	Spain	Egypt
Denmark	Sweden	Libya
England	Ukraine	Morocco
Finland		South Africa
France	Asia and Middle East	Australia and Oceania
Georgia	Armenia	Australia
Germany	Azerbaijan	New Zealand
Hungary	Chinese Taipei	
	Hong Kong SAR	

Benchmarking participants

Abu Dhabi, UAE	Dubai, UAE	Quebec, Canada
Alberta, Canada	Ontario, Canada	

PIRLS assesses reading for literary experience and for acquiring and using information. PIRLS asks students to engage in a full repertoire of reading skills and strategies, including:

- Focusing on and retrieving explicitly stated information;
- Making straightforward inferences;
- Interpreting and integrating ideas and information; and
- Examining or evaluating content, language, and textual elements.

NCES is authorized to conduct PIRLS under Section 153, of Public Law 107-279. Information collected will help the U.S. Department of Education's ongoing efforts to benchmark student achievement in the United States. Participation is voluntary. Data collected may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347) and Section 183, Public Law 107-279). The U.S. Office of Management and Budget has approved the data collection under OMB # 1850-0645. Individual responses will be combined with those from other participants to produce summary statistics and reports.

PIRLS



:ies NATIONAL CENTER FOR
EDUCATION STATISTICS
Institute of Education Sciences

For questions about PIRLS 2011,
contact the PIRLS Information Hotline
at 1-888-369-5033
or email TIMSS-PIRLS@westat.com



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PIRLS



Progress in International Reading Literacy Study (PIRLS) 2011

:ies NATIONAL CENTER FOR
EDUCATION STATISTICS
Institute of Education Sciences

Exhibit D-4. PIRLS study brochure—Continued

What is PIRLS?

The Progress in International Reading Literacy Study (PIRLS) is an international assessment and research project designed to measure both trends in fourth-grade students' reading literacy achievement as well as school and teacher practices related to reading instruction. PIRLS 2011 is the third such study in the PIRLS series of internationally comparative reading studies carried out in countries around the world every 5 years. In PIRLS 2011, students from more than 50 countries, including the United States, will participate.

PIRLS is sponsored by the International Association for the Evaluation of Educational Achievement (IEA) and managed in the United States by the National Center for Education Statistics (NCES), part of the U.S. Department of Education.

Why is PIRLS important?

PIRLS provides a unique opportunity to compare the reading knowledge and skills of U.S. fourth-graders with their peers in countries around the world. PIRLS complements what we learn from national assessments by identifying the strengths and weaknesses of students in reading relative to students around the world. The results inform national discussions about U.S. education performance and practice within the wider context of international competitiveness.

Moreover, by participating in PIRLS 2011, the United States will obtain data about changes in children's



reading achievement over the past 10 years, including valuable information about changes in reading instruction, how those changes relate to students' performance in reading, and about home, school, and classroom influences on reading achievement.

What type of reading assessment is PIRLS?

PIRLS is designed to reflect the reading curriculum used in participating countries. PIRLS asks students to read two texts, either two literary texts (narrative fiction, generally drawn from children's books), two informational texts (typically excerpts from biographies, step-by-step instructions, or scientific or non-fictional materials), or one of each type. It then asks students about a dozen questions—both multiple-choice and open-ended “constructed response” questions—about the texts. These questions may range from identifying the place, time, and actions of the main characters or events to interpreting how characters might feel, why events occurred, or what the passage means overall (e.g., does the story teach a lesson?). Examples of released PIRLS test items can be viewed at http://nces.ed.gov/pubs2008/2008017_2.pdf.

Key findings from PIRLS 2006

- In PIRLS 2006, the average U.S. 4th-grader's reading literacy score (540) was above the PIRLS scale average of 500 but below that of 4th-graders in 7 of the other 39 participating countries and 3 of the 5 participating Canadian provinces.
- Among the 28 countries that participated in both the 2001 and 2006 PIRLS assessments, the average reading literacy score increased in 8 countries and decreased in 6 countries. In the rest of the countries, including the United States, there was no measurable change in the average reading literacy score.

PIRLS is also meant to study home and school factors associated with children's reading literacy by the fourth grade. To that end, PIRLS will also administer questionnaires to students, their teachers, and the principals of their schools. The questions are designed to measure key aspects of students' home and school environments. In this way, PIRLS provides each country with a rich source of information on the factors influencing reading literacy.

Exhibit D-5. TIMSS eighth-grade timeline of activities

[illegible]

Exhibit D-5. TIMSS eighth-grade timeline of activities—Continued

TIMELINE OF SCHOOL ACTIVITIES					
For additional information, go to http://nces.ed.gov/timss .		After agreement to participate	Prior to assessment day	Assessment day	Benefits
	Principal	<ul style="list-style-type: none"> Identifies a school coordinator. The school coordinator works with Westat assessment staff to plan for the assessment. 	<ul style="list-style-type: none"> Completes a brief School Questionnaire (about the characteristics of the school, its enrollment, resources, policies, and learning environment). Arranges assessment day space. 	<ul style="list-style-type: none"> Confirms space for assessment is problem-free. If necessary, helps to ensure all sampled students attend the assessment session. 	<ul style="list-style-type: none"> Receives a \$200 check for the school. Represents other similar U.S. schools. Receives feedback based on the performance of students in your school that took the TIMSS assessment. Receives U.S. national report with final results.
	School coordinator	<ul style="list-style-type: none"> Works with Westat assessment staff to select an assessment date convenient for the school. 	<ul style="list-style-type: none"> Completes Class Listing Form and Student Listing Forms and returns these to Westat (via fax, mail, or email). Ensures parents are notified that their children have been selected for the assessment. Works with assessment staff to identify students with special education needs. Meets with students/teachers as necessary to provide information about the study. 	<ul style="list-style-type: none"> Collects completed School and Teacher Questionnaires and returns them to assessment staff. Ensures all sampled students attend the assessment session. Meets with assessment staff and reviews the assessment. 	<ul style="list-style-type: none"> Receives a \$100 personal check. Receives U.S. national report with final results.
	Teachers of sampled classes	—	<ul style="list-style-type: none"> Complete Teacher Questionnaires and returns them to the school coordinator prior to assessment day. 	—	<ul style="list-style-type: none"> Represent the United States in the international study.
	Students	—	—	<ul style="list-style-type: none"> Students of the selected classes attend the assessment session and complete the assessment and Student Questionnaire. 	<ul style="list-style-type: none"> Receive a small thank-you gift. Represent the United States in the international study.
	Westat assessment staff (contracted by the U.S. Department of Education's National Center for Education Statistics to conduct the study and support participating schools)	<ul style="list-style-type: none"> Work with the school to set an assessment date. Help school coordinator with assessment details. Protect school and student confidentiality. 	<ul style="list-style-type: none"> Call the school coordinator to discuss assessment day space and student participation. Select classroom sample and notify school of selected classes. Provide School and Teacher Questionnaires to the school coordinator for distribution. 	<ul style="list-style-type: none"> Conduct assessment from start to finish. Furnish all the assessment materials, pencils, and test booklets. Conduct a brief followup interview with the school coordinator at the end of the assessment. Maintain security of all materials. 	—



Summary of Activities for School Coordinators

Grade 8

What will be asked of the school coordinator?

Upon the school's agreement to participate, Westat staff will work with the school coordinator to:

- Schedule the assessment. A Westat staff member will contact the school coordinator to schedule a convenient date between April 4 and May 27, 2011. The coordinator will need to arrange the use of each selected class' classroom or an alternative quiet space for the assessment.
- Review parent notification procedures. If your school requires parental permission to conduct the assessment(s), the Westat staff member will review these procedures with the school coordinator.
- Provide a list of eighth-grade mathematics classes. The school coordinator will receive instructions for preparing and submitting a list of eighth-grade mathematics classes. Classes from the list will be selected randomly to participate.
- Provide a student listing for each selected class.
All student names will be kept confidential and will never be linked to assessment booklets or results. Individual student responses or scores are NEVER reported or distributed.

Closer to the assessment date, the school coordinator will be asked to:

- Work with a Westat staff member to identify those students with special needs or limited English proficiency that preclude them from participating in the assessment.

- Notify parents, teachers, and students. Once the classes and students have been selected, a Westat staff member will work with the school coordinator on procedures for notifying parents, teachers, and students of the study and the benefits of participating.
- Receive the School and Teacher Questionnaires. The school coordinator will be mailed the School and Teacher Questionnaires and asked to distribute them to the school principal and teachers of the selected classes. The school coordinator should also retrieve the questionnaires and return them to the Westat staff member on assessment day.
- Confirm the assessment information. At least 2 weeks before the assessment, a Westat staff member will contact the school coordinator to confirm the date and location of the assessment.

On assessment day, the school coordinator will be asked to:

- Ensure that all students in the selected classes attend the assessment session. While it is not necessary for the school coordinator to be present during the session, the school coordinator should be available before the assessment to help locate selected students and ensure participation. **It is very important that student attendance rates be as high as possible** to avoid the need for a makeup session.

A graphic timeline of activities is also available for your convenience.

Please feel free to contact the U.S. TIMSS Home Office with any questions
via email at TIMSS-PIRLS@westat.com
or by calling **1-888-369-5033**



Frequently Asked Questions

Grade 8

What is the TIMSS?

TIMSS is an international assessment designed to measure trends in mathematics and science achievement of U.S. eighth-grade students. It provides a benchmark for how U.S. eighth-grade students perform relative to their peers in other countries. TIMSS also collects data from principals and teachers about school conditions and practices that relate to student achievement. TIMSS was first administered in 1995 and is in its fifth cycle. In 2011, more than 60 countries will participate in TIMSS.

Why was my school selected for participation?

Schools of varying demographics and locations were randomly selected so that the overall U.S. sample is representative of the overall U.S. school population. The random selection process is important for ensuring that a country's sample accurately reflects its schools and, therefore, can fairly be compared with samples of schools from other countries.

Will all our eighth-graders be asked to participate?

It depends on the number of eighth-grade classrooms in the school. In schools with only one or two eighth-grade classrooms, all students will be asked to participate. In schools with more than two eighth-grade classrooms, only students in two randomly selected classrooms will be asked to participate.

In addition, some students with special needs or limited English proficiency may be excused from the assessment.

Who conducts the assessment?

The entire assessment process will be undertaken by trained staff from Westat, a research organization under contract to the U.S. Department of Education's National Center for Education Statistics (NCES). NCES conducts this study under authorization in the Education Sciences Reform Act of 2002 (Public Law 107-279, Section 153). The U.S. Office of Management and Budget has approved the data collection under OMB # 1850-0645.

Do teachers need to help administer the assessment?

No. Westat staff will visit the school on the day of the assessment, bringing with them all the materials required, and they will handle the entire administration of the assessment.

When will the assessment be conducted?

The assessment will be conducted between April 4 and May 27, 2011. Westat will work with schools to identify an assessment date convenient for the school in that time period.

Where will the assessment be conducted?

The assessment will be conducted in the schools that are selected to participate.

How long does the assessment take?

The assessment session is approximately 2 ½ hours and includes the administration of the assessment, a brief questionnaire that students complete about themselves, and two breaks. The questionnaire takes approximately 30 minutes to complete.

What will happen with the collected data?

The data from the assessment will be used to evaluate how the knowledge and skills of U.S. students compare to those of their peers in other participating countries. By law, the data provided by schools, staff, and students may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Public Law 107-279, Section 183 and Title V, subtitle A of the E-Government Act of 2002 (P.L. 107-347)). Reports of the findings from the assessment will not identify participating districts, schools, students, or individual staff. Individual responses will be combined with those from other participants to produce summary statistics and reports.

Are schools required by federal law to participate?

No. School participation is voluntary. However, we hope you will participate in this study so that students like those in your school are accurately and fairly represented.

What do school staff and students do?

- Schools are asked to designate a School Coordinator to assist Westat staff members with in-school arrangements.
- The school principal or lead administrator will receive a School Questionnaire to complete. The questionnaire, which asks about the school environment and structure, takes about 20 minutes to complete.
- Teachers of the sampled eighth-grade classes will receive Teacher Questionnaires to complete. These questionnaires focus on the nature of implemented curricula, instructional practices, and attitudes toward mathematics and science. They take about 30 minutes to complete.
- Students will attend the assessment session (2½ hours in length) and will be asked to complete the assessment booklet and questionnaire. Those who do will receive a small gift as a thank-you.

For questions about TIMSS 2011, contact the TIMSS Information Hotline at **1-888-369-5033** or email TIMSS-PIRLS@westat.com.

Exhibit D-8. TIMSS eighth-grade study brochure

Other information collected by TIMSS

TIMSS is more than an assessment of student knowledge in mathematics and science. TIMSS also considers the context in which learning occurs. Students, teachers, and schools are asked about a variety of aspects of the environments in which content is taught, learned, practiced, and applied. In this way, TIMSS provides each country with a rich source of information on the factors influencing mathematics and science achievement.

Participating countries in TIMSS 2011

North and South America	Russian Federation	Mongolia
Chile	Scotland	Oman
Honduras	Serbia	Palestinian Nat'l Auth.
United States	Slovak Republic	Qatar
Europe	Slovenia	Saudi Arabia
Austria	Spain	Singapore
Belgium (Flemish)	Sweden	Syrian Arab Republic
Bosnia and Herzegovina	Turkey	Thailand
Czech Republic	Ukraine	United Arab Emirates
Denmark	Asia and Middle East	Yemen
England	Armenia	Africa
Finland	Azerbaijan	Botswana
Georgia	Bahrain	Egypt
Germany	Chinese Taipei	Ghana
Hungary	Hong Kong SAR	Libya
Ireland	Indonesia	Morocco
Italy	Iran, Islamic Rep. of	South Africa
Lithuania	Israel	Tunisia
Malta	Japan	Australia and Oceania
Macedonia	Jordan	Australia
Netherlands	Kazakhstan	New Zealand
Norway	Korea, Rep. of	
Poland	Kuwait	
Romania	Lebanon	
	Malaysia	

Benchmarking participants

Abu Dhabi, UAE	Dubai, UAE	Quebec, Canada
Alberta, Canada	Ontario, Canada	

NCES is authorized to conduct TIMSS under Section 153, of Public Law 107-279. Information collected will help the U.S. Department of Education's ongoing efforts to benchmark student achievement in the United States. Participation is voluntary. Data collected may be used only for statistical purposes and may not be disclosed, or used, in identifiable form for any other purpose (Title V, subtitle A of the E-Government Act of 2002 (PL 107-347) and Section 183, Public Law 107-279).

The U.S. Office of Management and Budget has approved the data collection under OMB # 1850-0645. Individual responses will be combined with those from other participants to produce summary statistics and reports.



For questions about TIMSS 2011,
contact the TIMSS Information Hotline
at 1-888-369-5033
or email TIMSS-PIRLS@westat.com



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Trends in International Mathematics and Science Study (TIMSS) 2011



Exhibit D-8. TIMSS eighth-grade study brochure—Continued

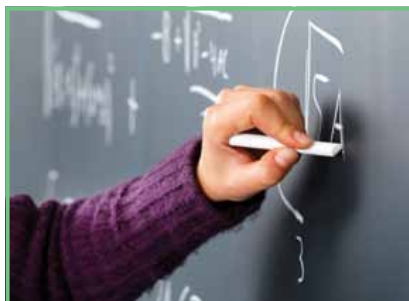
What is TIMSS?

The Trends in International Mathematics and Science Study (TIMSS) is an international assessment and research project designed to measure trends in mathematics and science achievement at the fourth- and eighth-grade levels as well as school and teacher practices related to instruction. Since 1995, TIMSS has been administered every 4 years. TIMSS 2011, the fifth study in the series, will involve students from more than 60 countries, including the United States.

TIMSS is sponsored by the International Association for the Evaluation of Educational Achievement (IEA) and managed in the United States by the National Center for Education Statistics (NCES), part of the U.S. Department of Education.

Why is TIMSS important?

TIMSS provides a unique opportunity to compare U.S. students' math and science knowledge and skills at the fourth- and eighth-grade levels with that of their peers in countries around the world. TIMSS complements what we learn from national assessments by identifying the strengths and weaknesses of student performance relative to students around the world. The results inform national discussions about education as well as international competitiveness.



TIMSS provides valuable benchmark information on how U.S. students compare to students around the world, allows educators and policymakers to examine other educational systems for practices that could have application to the United States, and contributes to ongoing discussions of ways to improve the quality of education for all students.

What type of assessment is TIMSS?

The TIMSS mathematics and science assessment is developed through an international consensus-building process involving input from U.S. and international experts in mathematics, science, and measurement. In a final step, the assessment is endorsed as suitable by all participating countries. The assessment contains a mix of questions: some require students to select appropriate responses, while others require that students solve problems and provide written answers. Examples of released TIMSS items are available at <http://nces.ed.gov/timss/educators.asp>.

Key findings from TIMSS 2007

- In TIMSS 2007, the average U.S. 4th-grader's mathematics score (529) was above the TIMSS scale average of 500 but below that of 4th-graders in 8 of the other 35 participating countries. The average U.S. 8th-graders' mathematics score (508) was also above the TIMSS scale average (500) but below that of 8th-graders in 5 of the other 47 participating countries. At both 4th and 8th grades, U.S. math scores in 2007 were higher than in 1995.
- In science, the 2007 TIMSS average U.S. 4th-graders' science score (539) was above the TIMSS scale average (500) but below that of 4th-graders in 4 of the other 35 participating countries. The average U.S. 8th-grader's science score (520) was also above the TIMSS scale average (500) but below that of 8th-graders in 9 of the other 47 participating countries. At both 4th and 8th grade, U.S. science scores in 2007 were not measurably different than in 1995.

Appendix E. Field Staff Training Materials

Contents

<u>Exhibits</u>		<u>Page</u>
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TIMSS-PIRLS 2011
Test Administrator Training Agenda
March 18 - 19, 2011 – Los Angeles, CA

DAY 1: 8:30 AM – 5:30 PM		
Session #1: Introduction to TIMSS & PIRLS 2011	8:30 - 9:00	<ul style="list-style-type: none">• Introduction to TIMSS – PIRLS• Timeline of Activities• TA Role Overview
Session #2: Checking Assignments	9:00 – 9:45	<ul style="list-style-type: none">• Review Assignment Materials• Review School Folder Content
Session # 3: Field Management System	9:45–10:15	<ul style="list-style-type: none">• Review of the FMS
10:15 – 10:30 Morning Break		
Session #4: Test Materials Demo	10:30 – 12:00	<ul style="list-style-type: none">• Review of Session Materials• Review of Bulk Materials
12:00 – 1:00 Lunch		
Session #5: Pre-assessment Activities	1:00 – 2:00	<ul style="list-style-type: none">• Review Preassessment Activities• Review Student Tracking Forms• Review Questionnaire Status
Session #6: Pre-assessment Call Role Play # 1 and 2	2:00 – 3:00	<ul style="list-style-type: none">• Role Play calling First Middle or Lincoln Academy
3:00 – 3:15 Afternoon Break		
Session #7: FMS Entry	3:15 – 4:00	<ul style="list-style-type: none">• Entering Preassessment Call Information into the FMS – First Middle or Lincoln Academy
Session #8: Pre-assessment Call Role Play # 3 and 4	4:00 – 5:00	<ul style="list-style-type: none">• Role – Play calling St. Peter Catholic or Jacobsen Academy
Session #9: FMS Entry	5:00 – 5:30	<ul style="list-style-type: none">• Entering Preassessment Call Information into the FMS – St. Peter Catholic or Jacobsen Academy

2/28/2011

TIMSS-PIRLS 2011
Test Administrator Training Agenda
March 18 - 19, 2011 – Los Angeles, CA

DAY 2: 8:30 - 5:30		
Session #10: Activities Upon Arrival at the School	8:30 – 9:00	<ul style="list-style-type: none"> • Activities Upon Arrival • Materials to Bring to the School
Session #11: Preparing the Booklets	9:00 – 9:45	<ul style="list-style-type: none"> • Review Steps for Preparing Booklets • Review Manipulatives • Coding Students
Session #12: Preparing the Booklets – Exercise #1	9:45 – 10:15	<ul style="list-style-type: none"> • Exercise #1: Preparing the Booklets for a TIMSS 8 Class
10:15 – 10:30 Morning Break		
Session #13: Preparing the Booklets – Exercise #2	10:30–11:00	<ul style="list-style-type: none"> • Exercise #2: Preparing the Booklets for a TIMSS-NAEP Link Class
Session #14: Conducting the TIMSS/PIRLS Assessment According to International Guidelines	11:00-12:00	<ul style="list-style-type: none"> • Arrival at the School • Distributing Booklets • Reading the Script
12:00 – 1:00 Lunch		
Session #15: Session Script Dyad	1:00 – 1:30	<ul style="list-style-type: none"> • Role Play Reading the Session Script for a TIMSS 8 and TIMSS-NAEP Link Session
Session #16: Questionnaire Guide	1:30 – 2:00	<ul style="list-style-type: none"> • Review of the Questionnaire Guide • How to Answer Student Questions
Session #17: Supervising the Session	2:00 – 2:30	<ul style="list-style-type: none"> • Review How to Supervise Each Session Type: TIMSS, PIRLS, TIMSS-NAEP Link • Supervising the Use of Manipulatives • Handling Difficult Situations
Session #18: Concluding the Session	2:30 – 3:30	<ul style="list-style-type: none"> • Ending the Session • Collecting Booklets • Activities to Complete Before Leaving the School
3:30 – 3:45 Afternoon Break		
Session #19: Training Your AA	3:45 – 4:15	<ul style="list-style-type: none"> • Training your Assessment Administrator • Review Training Script
Session #20: Security and Privacy	4:15 – 4:45	<ul style="list-style-type: none"> • Westat Video
Session #21: Meet with FM	4:45 – 5:30	<ul style="list-style-type: none"> • Assignments • Report Calls

2/28/2011

TIMSS & PIRLS Spring 2011
Preassessment Call Log/ROC

School Name and ID: _____

TIMSS or PIRLS
(Circle one or both)

School Coordinator: _____

School Coordinator Email: _____

School Phone Number: _____

Date of Assessment: _____

Completed Forms Missing: (check missing form, if any)

Class Listing Form ☐

If TIMSS, Student Teacher Linkage Form(s) ☐

If PIRLS, Student Listing Form(s) ☐

IDENTIFY YOURSELF AND ASK TO SPEAK WITH THE SCHOOL COORDINATOR.

IF HE/SHE IS NOT AVAILABLE, SCHEDULE A TIME TO CALL BACK.

_____/_____
CALLBACK DATE/TIME

1. Confirm assessment date.

2. Confirm and/or set time and location.

DISCUSS TIMING OF SESSIONS AND REMEMBER TIMSS, PIRLS, AND TIMSS-NAEP
LINK SESSIONS CANNOT BE ADMINISTERED IN THE SAME LOCATION BECAUSE OF
TIMING DIFFERENCES. AT 4TH GRADE YOU CAN ASSESS 2 TIMSS OR 2 PIRLS AT
THE SAME TIME AND LOCATION.

TIMSS & PIRLS Spring 2011
Preassessment Call Log/ROC

3. IF WE HAVE NOT RECEIVED THE CLASS LISTING FORM.

Was the Information Packet received containing the School Coordinator Handbook and Class Listing Form?

☐ Yes (ASK THE SCHOOL COORDINATOR TO SEND THE FORM BACK AND SCHEDULE A CALL BACK DATE AND TIME)

☐ No (IF NO, LET THE SCHOOL COORDINATOR KNOW THAT A PACKET WILL BE RE-MAILED AND SCHEDULE A CALL BACK DATE AND TIME)

_____/_____
CALLBACK DATE/TIME

SEND EMAIL TO TIMSS-PIRLS@WESTAT.COM NOTIFYING THE HOME OFFICE THAT NO CLASS LISTING PACKAGE WAS RECEIVED AND THAT THE HOME OFFICE SHOULD DIRECTLY CONTACT THE SCHOOL COORDINATOR FOR THE CLASS LISTING INFORMATION.

4. IF WE HAVE NOT RECEIVED THE STUDENT TEACHER LINKAGE FORM/STUDENT LISTING FORM:

Was the packet received containing the Student Teacher Linkage Form(s)/Student Listing Form(s)?

☐ Yes (ASK THE SCHOOL COORDINATOR TO LOCATE THE FORM BACK AND CONTINUE)

In the packet are the [Student Teacher Linkage/Student Listing] Forms. There is one form for each selected class. On each form we need you to list the students in the sampled class and each student's gender and date of birth. If any of the sampled students have special needs and should be excluded, please put the appropriate exclusion code in the Exclusion Status column.

IF THIS IS A **TIMSS** SCHOOL:

We also need you to list each sampled student's math and science teachers in the appropriate columns.

Do you have any questions about this form?

ANSWER ANY QUESTIONS. IF YOU DO NOT KNOW THE ANSWER TO A QUESTION TELL THE SCHOOL COORDINATOR THAT YOU WILL GET BACK TO HIM/HER.

TIMSS & PIRLS Spring 2011
Preassessment Call Log/ROC

- ☐ No (IF NO, LET THE SCHOOL COORDINATOR KNOW THAT A PACKET WILL BE RE-MAILED AND CONTINUE WITH THE CALL)

5. Review the **Student Tracking Form (STF)** to confirm demographic data for each sampled student, as well as to confirm any student exclusion or new enrollee information. Update the form as necessary.

IF STUDENT IDS (RATHER THAN STUDENT NAMES) WERE USED ON THE STUDENT TRACKING FORM, REMIND THE SC THAT THEIR COPY OF THE STUDENT TRACKING FORM (WHICH INCLUDES STUDENT NAMES) SHOULD BE READILY AVAILABLE WHEN YOU ARRIVE AT THE SCHOOL.

6. Review the school and teacher questionnaire status. Record the status on the **Teacher Tracking Form**.

USE THE SCHOOL ADMINISTRATOR/TEACHER QUESTIONNAIRE STATUS REPORT FROM THE FMS TO DETERMINE IF THERE ARE QUESTIONNAIRES THAT ARE NOT COMPLETED. IF THERE ARE MISSING QUESTIONNAIRES, TELL THE SC THAT WE WILL SEND PAPER VERSIONS TO BE COMPLETED. EMAIL THE HOME OFFICE AT TIMSSWH@WESTAT.COM REQUESTING THE NUMBER AND TYPE OF QUESTIONNAIRES THAT SHOULD BE SENT. WHEN REQUESTING HARD COPY, PLEASE PROVIDE THE FOLLOWING:

FOR THE SCHOOL QUESTIONNAIRE:

- SCHOOL ID
- SCHOOL NAME
- SCHOOL COORDINATOR NAME

FOR TEACHER QUESTIONNAIRE:

- SCHOOL ID
- SCHOOL NAME
- SCHOOL COORDINATOR NAME
- TEACHER ID
- TEACHER NAME
- CLASS ID
- CLASS NAME
- SUBJECT

TIMSS & PIRLS Spring 2011
Preassessment Call Log/ROC

7. Discuss procedures for gathering the students on assessment day.

8. **(TIMSS 8)** Does the school have a policy about calculator use? Calculators are allowed in TIMSS but if it is against school policy calculators will not be distributed.

9. Review parent notification procedures and receipt of consent forms if applicable. If consent is needed in the school, discuss with the SC what can be done to obtain consent.

YOU MUST COLLECT A DATED COPY OF THE LETTER SENT TO THE PARENTS ON ASSESSMENT DAY.

10. Make arrangements for the SC, school principal, or classroom teacher to be available in each session to introduce you to the class.

11. Review the handling of emergencies, problem situations, bathroom breaks and procedures for dismissing students at the end of the session.

TIMSS & PIRLS Spring 2011
Preassessment Call Log/ROC

12. Ask for directions to the school, if you need them.

13. Ask where you should report when you arrive at the school and tell the School Coordinator that you'll be arriving at least one hour before the scheduled assessment time to get your materials ready.

14. Who should the school honorarium check be made out to?
CONFIRM SPELLING OF THE NAME (SCHOOL, PRINCIPAL, ETC.).

15. For school coordinator honorarium, confirm the spelling of the name.

16. THANK THE SCHOOL COORDINATOR.

TIMSS & PIRLS Spring 2011
Preassessment Call Log/ROC

RECORD EACH CALL

Record of Contacts:

Person you spoke to	Date	Time	Outcome


PIRLS Session Script

2011







TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Administering the PIRLS Assessment

The instructions marked with the  symbol and printed in **bold** font style in the PIRLS administration script must be read aloud to the students word for word to ensure that the testing sessions are conducted in the same way in all countries. Although you should become familiar with these instructions before the actual testing, do not attempt to memorize them. Read these instructions exactly as they are written. Comments that are not in bold are not to be read aloud. They are instructions for you only.

To begin the testing session:

-  Make sure that the School Coordinator has recorded the Class ID at the top of the PIRLS Test Administration Form. If missing, you can find it on the Student Tracking Form, Column [b].
-  Make sure the students are seated quietly, with nothing on the desk except for a pencil.
-  Record the current time in Cell (9a) of the PIRLS Test Administration Form.
-  Begin reading the PIRLS Test Administration Script.

The PIRLS Session Script



This school has been chosen to take part in an important international project to study how well children around the world can read. Different countries from all over the world are taking part in this study. While I talk to you about today’s test, I would like you all to be quiet, stay at your desks, and listen carefully.



Now I will pass out the test booklets. Do not remove the booklet from the envelope until I tell you to do so. Each of you will receive one test booklet. Not all booklets are the same.



If you still have any schoolbooks or papers on your desk, please put them away. All electronic devices, such as cell phones, portable computers, photo or video cameras, must be off and stored away for the duration of the test administration.

As you hand out the test booklets, make sure that each student receives the booklet specially prepared for him or her. You can do that by reading the name on each test booklet, and giving it to that student.

Please make sure that all students who receive Booklet R also receive the PIRLS Reader.

Do not allow students to open the test booklets until you tell them to.

Record the student’s participation status in Column 7 (Achievement Session) of the Student Tracking Form. If you are administering a makeup session, then use the shaded part of Column 7 (Achievement Session).

If a student is absent, put that test booklet aside. Do not give it to anyone else, since each test booklet is marked for a specific student.

If there is a student in the classroom who is not listed on the Student Tracking Form, or an originally assigned booklet is damaged, use one of the three spare booklets.

After the test booklets are passed out and the Student Tracking Form has been completed, say the following to the students:



Please take your test booklet out of the envelope. Turn to the first page in the booklet that says “General Directions.” Please read along as I read the Directions aloud.

Please do not admit any students into the testing session at this point.

General Directions



In this test, you will read stories or articles and answer questions about what you have read. You may find some parts easy and you may find some parts difficult.



You will be asked to answer different types of questions. Some of the questions will be followed by four choices. You will choose the best answer and fill in the oval next to that answer. Example 1 shows this type of question.

Example 1

1. How many days are there in a week?

☐ 2 days

☐ 4 days

☒ 7 days

☐ 10 days



The oval next to “7 days” is filled in because there are 7 days in a week.



If you are not sure about the answer to a question, fill in the oval next to the answer you think is best, and move on to the next question.



If you decide to change an answer to a question, completely erase your first choice, and then fill in the oval next to your new choice.



As you work through the questions, you will need to look back at the passages you have read to help you answer the questions.



For some questions you will be asked to write your answers in the space provided in your booklet. Example 2 shows one question like this.

Example 2

2. Where does the little boy go after he finds the book?





Example 2 has a pencil with a 1 next to it. This means the question is worth 1 point. For questions worth 1 point, you need to write a few words, or a sentence.



Example 3 shows a question with a pencil with a 3 next to it. This means the question is worth 3 points. For questions worth 2 or 3 points, you need to explain

your view using what you have read in the story or article. You may write in full sentences if you wish.

Example 3

3. What makes the ending of the story both happy and sad? Use what you have read in the story to help you explain.





You will have 40 minutes to work in your test booklet and then we will take a short break. Then, you will work for another 40 minutes.



Do your best to answer all the questions. If you cannot answer a question, move on to the next one.

Instructions for Part One



At the end of the first part of your booklet, you will see a STOP message. Do not continue with the rest of the booklet until you are told to do so. You can review what you just worked on until the time is up [or take a book you have with you and read quietly at your desk]. [I have some activities sheets available for you. If you are finished early, please raise your hand to receive one.]



Do you have any questions?

When all problems are resolved and you have the students' attention again, record the current time in Cell (9b) of the PIRLS Test Administration Form. Then say:



Turn the page and begin reading the first story in your booklet.

Begin timing the 40 minutes for Part 1. Record the current time in Cell (10a) of the PIRLS Test Administration Form.

Make sure all students begin working on the correct part of the booklet. Students assigned the PIRLS Reader and Booklet R should be reading the first story in the PIRLS Reader.

Please make sure that students with Booklets 5, 6, and 10 pull out the leaflet that accompanies their booklet and use it to answer the questions in the first section of their test booklet. All other students should begin reading the story/article in the first section of the test booklet.

Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets.

After 35 minutes have passed, say the following:



You have 5 minutes left to work on this part of your booklet. Make sure you try to finish answering all of the questions in the first part of your booklet before the break.

After the last 5 minutes have passed, say:



Your time is up. Please close your booklets, and put your pencils down. Do not write anything more. We will now take a [insert amount of time (up to 30 minutes) that is adequate for your students] break.

Record the current time in Cell (10b) of the PIRLS Test Administration Form.

Break

If the room will be left unattended during the break, collect the booklets from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the first half of the testing session.

Part Two

Record the current time in Cell (11a) of the PIRLS Test Administration Form.

Make sure all the students are seated. When the students are seated and quiet redistribute the test booklets, if necessary. Then, say the following:



Does everybody have his or her test booklet?

When all problems are resolved and you have the students' attention again, record the current time in Cell (11b) of the PIRLS Test Administration Form and say:



You are now going to read a story or article and work on questions in the second part of your test booklet.



At the end of the second part of your booklet, you will see a STOP message. If you are finished early, you can review your work on the second part of your booklet.



Open to the second story in your test booklet and you may begin.

Begin timing the 40 minutes for the second part of the session. Record the current time in Cell (12a) of the PIRLS Test Administration Form.

Make sure all students begin working on the correct part of the booklet. Students assigned the PIRLS Reader and Booklet R should be reading the second story in the PIRLS Reader.

Please make sure that students with Booklets 5, 6, and 10 pull out the leaflet that accompanies their booklet and use it to answer the questions in the second section of their test booklet.

All other students should begin reading the story/article in the second section of the test booklet. Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets. If a student is finished early, make sure that he or she has a book to read.

After 35 minutes have passed, say the following:



You have 5 minutes left to work on this part of your booklet. Make sure you try to finish answering all of the questions in the second part of your booklet.

After the last 5 minutes have passed, say:



Your time is up, please stop working.

Record the current time in Cell (12b) of the PIRLS Test Administration Form and say:



Now please turn to the page of your booklet with the pictures of smiley faces and answer the questions about how much you liked the things you read. For example, if you liked the story a lot, then fill in the oval next to the smiling face and the words “I liked it a lot.”

Make sure that all students are answering the questions on the page of the booklet with the smiley faces only. If they need help answering these questions, you are free to help them. Once they are finished, please say:



Thank you for your work. I’m now going to collect all of your extra materials. You will need to keep your pencil and test booklet. If you were given a brochure or leaflet, please place them in the upper right corner of your desk and I will come around and collect them.

Collect the PIRLS Reader and Day of Hiking leaflet. Make sure you account for all the items that you distributed.

If the Student Questionnaire is going to be administered now, say:



We will now take a short break. Afterwards, I will ask you to answer a short questionnaire. (Please be back on time.)

If the room will be left unattended during the break, collect the booklets in the envelopes from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets and envelopes after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the testing session.

If the Student Questionnaire is going to be administered at a later time, say:



Please insert the booklet into the envelope it was in when you received it.



Collect all test booklets and keep them secure. Check against the Student Tracking Form to make sure that you have received all test booklets. Use the sequential number you assigned to the front of the envelope to help in this process.

Administering the Student Questionnaire

Before you begin the questionnaire administration:

- ☐ Make sure that you have the corresponding Student Tracking Form and PIRLS Test Administration Form.
- ☐ Make sure all the students are in the class; all are seated quietly, and have a pencil.




When ready, say:

-  **Now you will complete a short questionnaire. Turn to the colored divider page in your booklet. Do not begin the questionnaire until I tell you to do so.**
-  **The directions are printed at the beginning of your questionnaire. I will also read them to you. It is important that you follow the directions very carefully so that you understand how to mark your answers. Now open the questionnaire and turn to the first page titled “Directions.”**

Make sure that the students have their questionnaires open to the Directions page before proceeding.

-  **Please follow the directions in your questionnaire as I read them aloud.**

Directions

-  **In this booklet, you will find questions about you and what you think. For each question, you should choose the answer you think is best.**
-  **Let us take a few minutes to practice the kinds of questions you will answer in this booklet.**
-  **Example 1 is one kind of question you will find in this booklet.**

Example 1

Do you go to school?

Fill in **one** oval only.

Yes -- ☐

No -- ☐

Make sure that all students are following along and are looking at Example 1 in their questionnaires.



In Example 1, the question asks, “Do you go to school?” Below this question are a “Yes” and a “No.” Since you all go to school, you should all fill in the oval next to “Yes.”

Give students time to fill in the oval next to “Yes” and make sure they understand how to do it. Once everyone has completed the example, move on to Example 2.

Make sure that all students are following along and are looking at Example 2 in their questionnaires.



Example 2 is another kind of question you will find in this booklet.

Example 2


How often do you do these things?

Fill in **one** oval for each line.

	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
a) I talk with my friends -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I play sports -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I ride a skateboard -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>




This question asks “How often do you do these things?” Letter (a) says, “I talk with my friends.” You are given four choices for how often you do this: Every day or almost every day; Once or twice a week; Once or twice a month; and Never or almost never.

-  **Fill in the oval below your answer. For example, if you talk to your friends every day or almost every day, fill in the first oval under “Every day or almost every day.”**

Give students time to fill in their answers to all parts of the Example 2 question and make sure they understand how to answer this kind of question. Once everyone has completed the example, move on to Example 3.

Make sure that all students are following along and are looking at Example 3 in their questionnaires.


-  **Example 3 is another kind of question you will find in this booklet.**


Example 3

What do you think? Tell how much you agree with these statements.





*Fill in **one** oval for each line.*

	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) Watching movies is fun -----	①	②	③	④
b) I like eating ice cream -----	①	②	③	④
c) I do not like waking up early -----	①	②	③	④
d) I enjoy doing chores -----	①	②	③	④

-  **Example 3 says, “What do you think? Tell how much you agree with these statements.” Letter (a) says, “Watching movies is fun.” You are given four choices for how much you agree with the statement: Agree a lot, Agree a little, Disagree a little, or Disagree a lot.**

-  **Fill in the oval below your answer. For example, if you really agree a lot with that, fill in the first oval under “Agree a lot.” If you really disagree a lot, fill in the oval under “Disagree a lot.”**

Give students time to fill in their answers to all parts of the Example 3 question and make sure they understand how to answer this kind of question. Then continue reading the final directions:

-  **Read each question carefully, and pick the answer you think is best.**
-  **Fill in the oval next to or under your answer.**
-  **If you decide to change your answer, completely erase your first choice. Then, fill in the oval next to or under your new answer.**
-  **Ask for help if you do not understand something or are not sure how to answer.**



Are there any questions before we start?

If there are questions try to answer them the best you can. If there are no more questions then record the current time in Cell (13a) of the PIRLS Test Administration Form and proceed with the administration of the questionnaire.



Turn the page to the first question and begin answering this questionnaire. You will have 30 minutes to answer these questions.

After 30 minutes are up, say:



Please raise your hand if you have finished answering the questions.

If not all of the students raise their hands, allow for additional time and say:



You will have more time to continue answering this questionnaire. If you have already finished all the questions, then you can use this time to review your answers. Once you have finished, please close your booklet and read quietly at your desk.

Once all students have finished and have closed their booklets record the current time in Cell (13b) of the Test Administration Form. Then say:



Thank you very much for participating in this study. Your work will help us to learn more about our students and schools.



Please close your booklets and stay seated.



Please insert the booklet into the envelope it was in when you received it and seal the envelope closed. Once you have done this, remove the label that contains your name from the envelope. Peel it off and I will collect it.

Collect all test booklets and envelopes and keep them secure. Check against the Student Tracking Form to make sure that you have received all of them. Use the sequential number you assigned to the front of the envelope to help in this process.

Thank you again for your help in conducting this important international study.


TIMSS 4 Session Script

2011



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College


Administering the Assessment


The instructions marked with the  symbol and printed in **Bold** font style in the administration script must be read aloud to the students word for word (unless otherwise noted) to ensure that the testing sessions are conducted in the same way in all countries. Although you should become familiar with these instructions before the actual testing, do not attempt to memorize them. Read these instructions exactly as they are written. Comments that are not in bold are not to be read aloud. They are instructions for you only.


To begin the testing session:

- ☐ Make sure that the Class ID is recorded at the top of the Test Administration Form. If missing, you can find it on the Student Tracking Form, Column [b].
- ☐ Make sure that students are seated quietly, with nothing on the desk except for a pencil.
- ☐ Record the current time in Cell (9a) of the Test Administration Form.
- ☐ Begin reading the Administration Script.

The Fourth-grade Session Script

 **This school has been chosen to take part in an important international project to study what students around the world know and can do in mathematics and science. Different countries from all over the world are taking part in this study. You will be taking a mathematics and science test. While I talk to you about today’s test, I would like you all to be quiet, stay at your desks, and listen carefully.**

 **Now I will pass out the test booklets. Do not remove the booklet from the envelope until I tell you to do so. Each of you will receive one test booklet. Not all booklets are the same.**

 **If you still have any schoolbooks, papers, or other materials—for example, a ruler—on your desk, please put them away. All electronic devices, such as calculators, cell phones, portable computers, photo or video cameras, must be off and stored away for the duration of the test administration.**

Students should have only a pencil and his or her booklet for the duration of test administration.

As you hand out the test booklets, make sure that each student receives the booklet specially prepared for him or her. You can do that by reading the name on each test booklet, and giving it to that student. Do not allow students to open the test booklets until you tell them to.

Record the student’s participation status in Column 7 (Achievement Session) of the Student Tracking Form.

If you are administering a makeup session, then use the shaded part of Column 7 (Achievement Session).


If a student is absent, put that test booklet aside. Do not give it to anyone else, since each test booklet is marked for a specific student.

If there is a student in the classroom who is not listed on the Student Tracking Form, or an originally assigned booklet is damaged, use one of the three spare booklets, as explained in Section 1.2.1.

After the test booklets are passed out and the Student Tracking Form has been completed, say the following to the students:

 **Does everybody have his or her test booklet?**

If yes, then continue. If not, find out why and proceed as described before.

 **Please take your test booklet out of the envelope. Turn to the first page in the booklet that says “General Directions.” Please read along as I read the Directions aloud.**

Please do not admit any students into the testing session at this point.

General Directions



In this test, you will answer questions in mathematics and science. You may find some questions easy, and you may find some questions difficult. Try to answer all questions, the difficult ones as well as the easy ones.



For some questions, you choose the answer you think is correct, and fill in the oval next to it. Example 1 shows this kind of question with the circle next to the correct answer filled in.

Example 1

How many minutes are there in 1 hour?

☐ A 12

☐ B 24

☒ C 60

☐ D 120



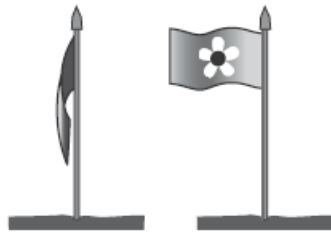
The oval with the letter “C” has been filled in because there are 60 minutes in one hour. If you are not sure about the answer to a question, fill in the oval next to the answer you think is best, and move on to the next question.

If you decide to change an answer to a question, completely erase your first choice, and then fill in the oval next to your new choice.



For some questions, you must write your answer in the space below the question. Words, drawings, or numbers are used in answers to these questions. Example 3 shows a question like this.

There is a flag in John's garden. Sometimes it hangs from the flag pole and sometimes it waves as shown below.



What makes the flag wave?

The wind makes the flag wave.

Example 3



Sometimes, to get full points, you will need to explain your answers for science questions, or show your work for mathematics questions. Keep your writing and calculations as neat as possible, and give mathematics answers in their simplest form. For problems in the test involving money, suppose you are in a country where the “Zed” is used as the unit of money, like a dollar.



When you are asked to write an answer, be sure that your handwriting is clear. Think carefully about each question, and answer as completely as possible. If you are not sure about the answer, give the answer you think is best, and move on to the next question.







You will have 36 minutes to work in the first part of your test booklet. You will then have a short break. After the break, you will work for another 36 minutes in the second part.




You may not use a calculator during the test.

Instructions for Part 1

-  **Read each question carefully and answer it as well as you can. If you are not sure about the answer to a question, choose or write the answer you think is best, and continue with the next question on the test.**
-  **You will have 36 minutes to complete this part of the test.**
-  **Do not start working until you are told to do so.**
-  **At the end of the first part of your booklet, you will see a STOP message. Do not continue with the rest of the booklet until you are told to do so. If you have completed Part 1 before the time is up, you can review your answers until the time is up or take a book you have with you and read quietly at your desk. Do you have any questions?**


When all problems are resolved and you have the students' attention again, record the current time in Cell (9b) of the Test Administration Form. Then say:

-  **Turn the page to the beginning of Part 1, and start working immediately. Remember, you have 36 minutes to complete the first part of the booklet.**

Begin timing the 36 minutes for Part 1. Record the current time in Cell (10a) of the Test Administration Form.

Make sure all students begin working on the correct part of the booklet. Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets.

10 minutes before the testing session ends, say the following:

-  **You have 10 minutes left before the break. Make sure you try to finish answering all of the questions in the first part of your booklet before the break.**

After the last 10 minutes have passed, say:

-  **Your time is up. Please close your booklets, and put your pencils down. Do not write anything more. We will now take a short break.**

Record the current time in Cell (10b) of the Test Administration Form.

Break

If the room will be left unattended during the break, collect the booklets from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the first half of the testing session.


Instructions for Part 2


Record the current time in Cell (11a) of the Test Administration Form.

Make sure all the students are seated. When the students are seated and quiet redistribute the test booklets, if necessary. Then, say the following:


 **Does everybody have their test booklet?**

When all problems are resolved and you have the students' attention again, proceed with the instructions for Part 2.


 **In Part 2, you will answer more questions in mathematics or science. You will have 36 minutes to work on this part of the test.**

 **Read each question carefully and answer it as well as you can. If you are not sure about the answer to a question, choose or write the answer you think is best, and move on to the next question.**

 **Do not start working until you are told to do so.**

 **At the end of the second part of your booklet, you will see a STOP message. If you have completed Part 2 before the time is up, you can review your work on the second part of your booklet or take a book you have with you and read quietly at your desk. Do you have any questions?**


When all problems are resolved and you have the students' attention again, record the current time in Cell (11b) of the Test Administration Form and say:

 **Turn the page to the beginning of Part 2, and start working immediately. You have 36 minutes to complete the second part of the booklet.**

Begin timing the 36 minutes for the second part of the session. Record the current time in Cell (12a) of the Test Administration Form.

Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets. If a student is finished early, make sure that he or she has a book to read.

10 minutes before the testing session ends, say the following:

 **You have 10 minutes left to work on the second part of the booklet. Make sure you try to finish answering all of the questions in the second part of your booklet.**

After the last 10 minutes have passed, say:

 **Your time is up. Please close your booklets, and put your pencils down. Do not write anything more.**

Record the current time in Cell (12b) of the Test Administration Form, then say:

 **Thank you for your work.**

If the Student Questionnaire is going to be administered now, say:



We will now take a short break. Afterwards, I will ask you to answer a short questionnaire. (Please be back on time.)

If the room will be left unattended during the break, collect the booklets in the envelopes from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets and envelopes after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the testing session.

If the Student Questionnaire is going to be administered at a later time, say:



Please insert the booklet into the envelope it was in when you received it.

Collect all test booklets and keep them secure. Check against the Student Tracking Form to make sure that you have received all test booklets. Use the sequential number you assigned to the front of the envelope to help in this process.

Administering the Student Questionnaire


Before you begin the questionnaire administration:

☐ Make sure that you have the corresponding Student Tracking Form and TIMSS Test Administration Form


☐ Make sure all the students in the class are all seated quietly and have a pencil.

When ready, say:


 **Now you will complete a short questionnaire. Turn to the colored divider page in your booklet. Do not begin the questionnaire until I tell you to do so.**


 **The directions are printed at the beginning of your questionnaire. I will also read them to you. It is important that you follow the directions very carefully so that you understand how to mark your answers. Now open the questionnaire and turn to the first page titled “Directions.”**

Make sure that the students have their questionnaires open to the Directions page before proceeding.

 **Please follow the directions in your questionnaire as I read them aloud.**

Directions

 **In this booklet, you will find questions about you and what you think. For each question, you should choose the answer you think is best.**

 **Let us take a few minutes to practice the kinds of questions you will answer in this booklet.**

 **Example 1 is one kind of question you will find in this booklet.**


Make sure that all students are following along and are looking at Example 1 in their questionnaires.

Example 1 _____
Do you go to school?

*Fill in **one** oval only.*


Yes -- ☐

No -- ☐

-  In Example 1, the question asks, “Do you go to school?” Below this question are a “Yes” and a “No.” Since you all go to school, you should all fill in the oval next to “Yes.”

Give students time to fill in the circle next to “Yes” and make sure they understand how to do it. Once everyone has completed the example, move on to Example 2.

Make sure that all students are following along and are looking at Example 2 in their questionnaires.



-  Example 2 is another kind of question you will find in this booklet.

Example 2

How often do you do these things?


*Fill in **one** oval for each line.*

	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
a) I talk with my friends -----	<input type="radio"/> ①	<input type="radio"/> ②	<input type="radio"/> ③	<input type="radio"/> ④
b) I play sports -----	<input type="radio"/> ①	<input type="radio"/> ②	<input type="radio"/> ③	<input type="radio"/> ④
c) I ride a skateboard -----	<input type="radio"/> ①	<input type="radio"/> ②	<input type="radio"/> ③	<input type="radio"/> ④

-  This question asks “How often do you do these things?” Letter (a) says, “I talk with my friends.” You are given four choices for how often you do this: Every day or almost every day; Once or twice a week; Once or twice a month; and Never or almost never.
-  Fill in the oval below your answer. For example, if you talk to your friends every day or almost every day, fill in the first circle under “Every day or almost every day.”

Give students time to fill in their answers to all parts of the Example 2 question and make sure they understand how to answer this kind of question. Once everyone has completed the example, move on to Example 3.

Make sure that all students are following along and are looking at Example 3 in their questionnaires.


-  Example 3 is another kind of question you will find in this booklet.


Example 3

What do you think? Tell how much you agree with these statements.


*Fill in **one** oval for each line.*


	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) Watching movies is fun -----	①	②	③	④
b) I like eating ice cream -----	①	②	③	④
c) I do not like waking up early -----	①	②	③	④
d) I enjoy doing chores -----	①	②	③	④

 Example 3 says, “What do you think? Tell how much you agree with these statements.” Letter (a) says, “Watching movies is fun.” You are given four choices for how much you agree with the statement: Agree a lot, Agree a little, Disagree a little, or Disagree a lot.

 Fill in the oval below your answer. For example, if you really agree a lot with that, fill in the first oval under “Agree a lot.” If you really disagree a lot, fill in the oval under “Disagree a lot.”

Give students time to fill in their answers to all parts of the Example 3 question and make sure they understand how to answer this kind of question. Then continue reading the final directions:

 **Read each question carefully, and pick the answer you think is best.**

 **Fill in the oval next to or under your answer.**

 **If you decide to change your answer, completely erase your first choice. Then, fill in the oval next to or under your new answer.**

 **Ask for help if you do not understand something or are not sure how to answer.**

 **Are there any questions before we start?**


If there are questions try to answer them the best you can. If there are no more questions then record the current time in Cell (13a) of the Test Administration Form and proceed with the administration of the questionnaire.

-  **Turn the page to the first question and begin answering this questionnaire. You will have 30 minutes to answer these questions.**




After 30 minutes are up, say:

-  **Please raise your hand if you have finished answering the questions.**

If not all of the students raise their hands, allow for additional time and say:

-  **You will have more time to continue answering this questionnaire. If you have already finished all the questions, then you can use this time to review your answers. Once you have finished, please close your booklet and read quietly at your desk.**

Once all students have finished and have closed their booklets record the current time in Cell (13b) of the Test Administration Form. Then say:

-  **Thank you very much for participating in this study. Your work will help us to learn more about our students and schools.**
-  **Please close your booklets and stay seated.**
-  **Please insert the booklet into the envelope it was in when you received it and seal the envelope closed. Once you have done this, remove the label that contains your name from the envelope. Peel it off and I will collect it.**

Collect all test booklets and envelopes and keep them secure. Check against the Student Tracking Form to make sure that you have received all of them. Use the sequential number you assigned to the front of the envelope to help in this process.

Thank you again for your help in conducting this important international study.


TIMSS 8 Session Script

2011



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College




Administering the TIMSS 8 Assessment

The instructions marked with the  symbol and printed in **Bold** font style in the administration script must be read aloud to the students word for word (unless otherwise noted) to ensure that the testing sessions are conducted in the same way in all countries. Although you should become familiar with these instructions before the actual testing, do not attempt to memorize them. Read these instructions exactly as they are written. Comments that are not in bold are not to be read aloud. They are instructions for you only.

To begin the testing session:

- ☐ Make sure that the Class ID is recorded at the top of the Test Administration Form. If missing, you can find it on the Student Tracking Form, Column [b].
- ☐ Make sure that students are seated quietly, with nothing on the desk except for a pencil and calculator.
- ☐ Record the current time in Cell (9a) of the Test Administration Form.
- ☐ Begin reading the Administration Script.

The Eighth-grade Session Script

-  **This school has been chosen to take part in an important international project to study what students around the world know and can do in mathematics and science. Different countries from all over the world are taking part in this study. You will be taking a mathematics and science test. While I talk to you about today’s test, I would like you all to be quiet, stay at your desks, and listen carefully.**
-  **Now I will pass out the test booklets. Do not remove the booklet from the envelope until I tell you to do so. Each of you will receive one test booklet. Not all booklets are the same.**
-  **If you still have any schoolbooks, papers, or other materials—for example, a ruler—on your desk, please put them away. All electronic devices, such as cell phones, portable computers, photo or video cameras, must be off and stored away for the duration of the test administration.**

Students should have only a pencil, a calculator, and his or her booklet for the duration of test administration.

As you hand out the test booklets, make sure that each student receives the booklet specially prepared for him or her. You can do that by reading the name on each test booklet, and giving it to that student. Do not allow students to open the test booklets until you tell them to.

Record the student’s participation status in Column 7 (Achievement Session) of the Student Tracking Form.

If you are administering a makeup session, then use the shaded part of Column 7 (Achievement Session).


If a student is absent, put that test booklet aside. Do not give it to anyone else, since each test booklet is marked for a specific student.

If there is a student in the classroom who is not listed on the Student Tracking Form, or an originally assigned booklet is damaged, assign one of the three spare booklets.

After the test booklets are passed out and the Student Tracking Form has been completed, say the following to the students:

-  **Does everybody have his or her test booklet?**

If yes, then continue. If not, find out why and proceed as described before.

-  **Please take your test booklet out of the envelope. Turn to the first page in the booklet that says “General Directions.” Please read along as I read the Directions aloud.**

Please do not admit any students into the testing session at this point.

General Directions



In this test, you will answer questions in mathematics and science. You may find some questions easy, and you may find some questions difficult. Try to answer all questions, the difficult ones as well as the easy ones.



For some questions, you choose the answer you think is correct, and fill in the oval next to it. Example 1 shows this kind of question with the circle next to the correct answer filled in.

How many minutes are there in 1 hour?

<input type="radio"/>	A	12
<input type="radio"/>	B	24
<input checked="" type="radio"/>	C	60
<input type="radio"/>	D	120

Example 1



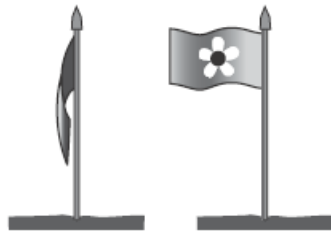
The oval with the letter “C” has been filled in because there are 60 minutes in one hour. If you are not sure about the answer to a question, fill in the oval next to the answer you think is best, and move on to the next question.

If you decide to change an answer to a question, completely erase your first choice, and then fill in the oval next to your new choice.



For some questions, you must write your answer in the space below the question. Words, drawings, or numbers are used in answers to these questions. Example 3 shows a question like this.

There is a flag in John's garden. Sometimes it hangs from the flag pole and sometimes it waves as shown below.



What makes the flag wave?

The wind makes the flag wave.

Example 3



Sometimes, to get full points, you will need to explain your answers for science questions, or show your work for mathematics questions. Keep your writing and calculations as neat as possible, and give mathematics answers in their simplest form. For problems in the test involving money, suppose you are in a country where the “Zed” is used as the unit of money, like a dollar.







When you are asked to write an answer, be sure that your handwriting is clear. Think carefully about each question, and answer as completely as possible. If you are not sure about the answer, give the answer you think is best, and move on to the next question.




You will have 45 minutes to work in the first part of your test booklet. You will then have a short break. After the break, you will work for another 45 minutes in the second part.

Instructions for Part 1

-  **Read each question carefully and answer it as well as you can. If you are not sure about the answer to a question, choose or write the answer you think is best, and continue with the next question on the test.**
-  **You will have 45 minutes to complete this part of the test.**
-  **Do not start working until you are told to do so.**
-  **At the end of the first part of your booklet, you will see a STOP message. Do not continue with the rest of the booklet until you are told to do so. If you have completed Part 1 before the time is up, you can review your answers until the time is up or take a book you have with you and read quietly at your desk. Do you have any questions?**


When all problems are resolved and you have the students' attention again, record the current time in Cell (9b) of the Test Administration Form. Then say:

-  **Turn the page to the beginning of Part 1, and start working immediately. Remember, you have 45 minutes to complete the first part of the booklet.**

Begin timing the 45 minutes for Part 1. Record the current time in Cell (10a) of the Test Administration Form.

Make sure all students begin working on the correct part of the booklet. Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets.

10 minutes before the testing session ends, say the following:

-  **You have 10 minutes left before the break. Make sure you try to finish answering all of the questions in the first part of your booklet before the break.**

After the last 10 minutes have passed, say:

-  **Your time is up. Please close your booklets, and put your pencils down. Do not write anything more. We will now take a short break.**

Record the current time in Cell (10b) of the Test Administration Form.

Break

If the room will be left unattended during the break, collect the booklets from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the first half of the testing session.


Instructions for Part 2


Record the current time in Cell (11a) of the Test Administration Form.

Make sure all the students are seated. When the students are seated and quiet redistribute the test booklets, if necessary. Then, say the following:


 **Does everybody have their test booklet?**

When all problems are resolved and you have the students' attention again, proceed with the instructions for Part 2.


 **In Part 2, you will answer more questions in mathematics or science. You will have 45 minutes to work on this part of the test.**

 **Read each question carefully and answer it as well as you can. If you are not sure about the answer to a question, choose or write the answer you think is best, and move on to the next question.**

 **Do not start working until you are told to do so.**

 **At the end of the second part of your booklet, you will see a STOP message. If you have completed Part 2 before the time is up, you can review your work on the second part of your booklet or take a book you have with you and read quietly at your desk. Do you have any questions?**


When all problems are resolved and you have the students' attention again, record the current time in Cell (11b) of the Test Administration Form and say:

 **Turn the page to the beginning of Part 2, and start working immediately. You have 45 minutes to complete the second part of the booklet.**

Begin timing the 45 minutes for the second part of the session. Record the current time in Cell (12a) of the Test Administration Form.

Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets. If a student is finished early, make sure that he or she has either a book to read or an activities sheet to work on.

10 minutes before the testing session ends, say the following:

 **You have 10 minutes left to work on the second part of the booklet. Make sure you try to finish answering all of the questions in the second part of your booklet.**

After the last 10 minutes have passed, say:

 **Your time is up. Please close your booklets, and put your pencils down. Do not write anything more.**

Record the current time in Cell (12b) of the Test Administration Form, then say:



Thank you for your work. I'm now going to collect calculators. You will need to keep your pencil and test booklet. If I passed out a calculator for you to use during the test, please place it on the upper right hand corner of your desk and I will come around and collect it.

Collect the calculators. Make sure you account for all the calculators that you distributed.

If the Student Questionnaire is going to be administered now, say:



We will now take a short break. Afterwards, I will ask you to answer a short questionnaire. (Please be back on time.)

If the room will be left unattended during the break, collect the booklets in the envelopes from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets and envelopes after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the testing session.

If the Student Questionnaire is going to be administered at a later time, say:



Please insert the booklet into the envelope it was in when you received it.

Collect all test booklets and keep them secure. Check against the Student Tracking Form to make sure that you have received all test booklets. Use the sequential number you assigned to the front of the envelope to help in this process. Collect all calculators.

Administering the Student Questionnaire

Before you begin the questionnaire administration:

- ☐ Make sure that you have the corresponding Student Tracking Form and TIMSS Test Administration Form.
- ☐ Make sure all the students are in the class are all seated quietly and have a pencil.

The Eighth -grade Questionnaire Administration Script

When ready, say:



Does everybody have his or her booklet?

If yes, then continue. If not, find out why and proceed as described before.



Now you will complete a short questionnaire. Turn to the colored divider page in your booklet. Do not begin the questionnaire until I tell you to do so.



The directions are printed at the beginning of your questionnaire. I will also read them to you. It is important that you follow the directions very carefully so that you understand how to mark your answers. Now open the questionnaire and turn to the first page titled “Directions.”

Make sure that the students have their questionnaires open to the Directions page before proceeding.



Please follow the directions in your questionnaire as I read them aloud.

Directions



In this booklet, you will find questions about you and what you think. For each question, you should choose the answer you think is best.



Let us take a few minutes to practice the kinds of questions you will answer in this booklet.



Example 1 is one kind of question you will find in this booklet.

Make sure that all students are following along and are looking at Example 1 in their questionnaires.


Example 1

Do you go to school?

*Fill in **one** oval only.*


Yes -- ☐

No -- ☐

-  In Example 1, the question asks, “Do you go to school?” Below this question are a “Yes” and a “No.” Since you all go to school, you should all fill in the oval next to “Yes.”

Give students time to fill in the circle next to “Yes” and make sure they understand how to do it. Once everyone has completed the example, move on to Example 2.

Make sure that all students are following along and are looking at Example 2 in their questionnaires.



-  Example 2 is another kind of question you will find in this booklet.

Example 2

How often do you do these things?


Fill in one oval for each line.

	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
a) I talk with my friends -----	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I play sports -----	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I ride a skateboard -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

-  This question asks “How often do you do these things?” Letter (a) says, “I talk with my friends.” You are given four choices for how often you do this: Every day or almost every day; Once or twice a week; Once or twice a month; and Never or almost never.
-  Fill in the oval below your answer. For example, if you talk to your friends every day or almost every day, fill in the first circle under “Every day or almost every day.”

Give students time to fill in their answers to all parts of the Example 2 question and make sure they understand how to answer this kind of question. Once everyone has completed the example, move on to Example 3.

Make sure that all students are following along and are looking at Example 3 in their questionnaires.


-  Example 3 is another kind of question you will find in this booklet.


Example 3

What do you think? Tell how much you agree with these statements.

*Fill in **one** oval for each line.*

	Agree a lot		Agree a little		Disagree a little		Disagree a lot
a) Watching movies is fun -----	①		②		③		④
b) I like eating ice cream -----	①		②		③		④
c) I do not like waking up early -----	①		②		③		④
d) I enjoy doing chores -----	①		②		③		④


 Example 3 says, “What do you think? Tell how much you agree with these statements.” Letter (a) says, “Watching movies is fun.” You are given four choices for how much you agree with the statement: Agree a lot, Agree a little, Disagree a little, or Disagree a lot.

 Fill in the oval below your answer. For example, if you really agree a lot with that, fill in the first oval under “Agree a lot.” If you really disagree a lot, fill in the oval under “Disagree a lot.”

Give students time to fill in their answers to all parts of the Example 3 question and make sure they understand how to answer this kind of question. Then continue reading the final directions:

 Read each question carefully, and pick the answer you think is best.


 Fill in the circle next to or under your answer.

 If you decide to change your answer, completely erase your first choice. Then, fill in the oval next to or under your new answer.

 Ask for help if you do not understand something or are not sure how to answer.

 Are there any questions before we start?

If there are questions try to answer them the best you can. If there are no more questions then record the current time in Cell (13a) of the Test Administration Form and proceed with the administration of the questionnaire.

 Turn the page to the first question and begin answering this questionnaire. You will have 30 minutes to answer these questions.

After 30 minutes are up, say:

 Please raise your hand if you have finished answering the questions.

If not all of the students raise their hands, allow for additional time and say:



You will have more time to continue answering this questionnaire. If you have already finished all the questions, then you can use this time to review your answers. Once you have finished, please close your booklet and read quietly at your desk.

Once all students have finished and have closed their booklets record the current time in Cell (13b) of the Test Administration Form. Then say:



Thank you very much for participating in this study. Your work will help us to learn more about our students and schools.



Please close your booklets and stay seated.



Please insert the booklet into the envelope it was in when you received it and seal the envelope closed. Once you have done this, remove the label that contains your name from the envelope. Peel it off and I will collect it.

Collect all test booklets and envelopes and keep them secure. Check against the Student Tracking Form to make sure that you have received all of them. Use the sequential number you assigned to the front of the envelope to help in this process.

Thank you again for your help in conducting this important international study.


TIMSS-NAEP Link Session Script

2011



TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College




Administering the TIMSS-NAEP Link Assessment

The instructions marked with the  symbol and printed in **Bold** font style in the administration script must be read aloud to the students word for word (unless otherwise noted) to ensure that the testing sessions are conducted in the same way in all countries. Although you should become familiar with these instructions before the actual testing, do not attempt to memorize them. Read these instructions exactly as they are written. Comments that are not in bold are not to be read aloud. They are instructions for you only.

To begin the testing session:

- ☐ Make sure that the Class ID is recorded at the top of the Test Administration Form. If missing, you can find it on the Student Tracking Form, Column [b].
- ☐ Make sure that students are seated quietly, with nothing on the desk except for a pencil and calculator.
- ☐ Record the current time in Cell (9a) of the Test Administration Form.
- ☐ Begin reading the Administration Script.

The TIMSS-NAEP Link Class Session Script

-  **This school has been chosen to take part in an important international project to study what students around the world know and can do in mathematics and science. Different countries from all over the world are taking part in this study. You will be taking a mathematics and science test. While I talk to you about today's test, I would like you all to be quiet, stay at your desks, and listen carefully.**
-  **Now I will pass out the test booklets. Do not remove the booklet from the envelope until I tell you to do so. Each of you will receive one test booklet. Not all booklets are the same.**
-  **If you still have any schoolbooks, papers, or other materials—for example, a ruler—on your desk, please put them away. All electronic devices, such as cell phones, portable computers, photo or video cameras, must be off and stored away for the duration of the test administration.**

Students should have only a pencil, calculator, and his or her booklet for the duration of test administration.

As you hand out the test booklets, make sure that each student receives the booklet specially prepared for him or her. You can do that by reading the name on each security envelope, and giving it to that student. Do not allow students to open the test booklets until you tell them to.

Record the student's participation status in Column 7 (Achievement Session) of the Student Tracking Form.



If you are administering a makeup session, then use the shaded part of Column 7 (Achievement Session).

If a student is absent, put that test booklet aside. Do not give it to anyone else, since each test booklet is marked for a specific student.

If there is a student in the classroom who is not listed on the Student Tracking Form, or an originally assigned booklet is damaged, use one of the three spare booklets. After the test booklets are passed out and the Student Tracking Form has been completed, say the following to the students:

-  **Does everybody have his or her test booklet?**

If yes, then continue. If not, find out why and proceed as described before.

-  **Please take your test booklet out of the envelope. If your booklet has an "N" in the top left corner, please put your calculator away. Your booklet will instruct you when you may use your calculator.**
-  **Turn to the first page in the booklet that says "General Directions". Please read along as I read the Directions aloud.**

Please do not admit any students into the testing session at this point.

General Directions



In this test, you will answer questions in mathematics and science. You may find some questions easy, and you may find some questions difficult. Try to answer all questions, the difficult ones as well as the easy ones.



For some questions, you choose the answer you think is correct, and fill in the oval next to it. Example 1 shows this kind of question with the circle next to the correct answer filled in.

How many minutes are there in 1 hour?

<input type="radio"/>	A	12
<input type="radio"/>	B	24
<input checked="" type="radio"/>	C	60
<input type="radio"/>	D	120

Example 1



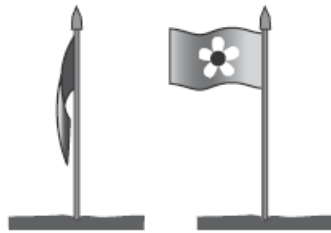
The oval with the letter “C” has been filled in because there are 60 minutes in one hour. If you are not sure about the answer to a question, fill in the oval next to the answer you think is best, and move on to the next question.

If you decide to change an answer to a question, completely erase your first choice, and then fill in the oval next to your new choice.



For some questions, you must write your answer in the space below the question. Words, drawings, or numbers are used in answers to these questions. Example 3 shows a question like this.

There is a flag in John's garden. Sometimes it hangs from the flag pole and sometimes it waves as shown below.



What makes the flag wave?

The wind makes the flag wave.

Example 3



Sometimes, to get full points, you will need to explain your answers for science questions, or show your work for mathematics questions. Keep your writing and calculations as neat as possible, and give mathematics answers in their simplest form. For some problems in the test involving money, suppose you are in a country where the “Zed” is used as the unit of money, like dollars.







When you are asked to write an answer, be sure that your handwriting is clear. Think carefully about each question, and answer as completely as possible. If you are not sure about the answer, give the answer you think is best, and move on to the next question.




You will have 47 minutes to work in the first part of your test booklet. You will then have a short break. After the break, you will work for another 45 minutes in the second part.

Instructions for Part 1

-  **Read each question carefully and answer it as well as you can. If you are not sure about the answer to a question, choose or write the answer you think is best, and continue with the next question on the test.**
-  **You will have 47 minutes to complete this part of the test.**
-  **Do not start working until you are told to do so.**
-  **At the end of the first part of your booklet, you will see a STOP message. Do not continue with the rest of the booklet until you are told to do so. If you have completed Part 1 before the time is up, you can review your answers until the time is up or take a book you have with you and read quietly at your desk. Do you have any questions?**

When all problems are resolved and you have the students' attention again, record the current time in Cell (9b) of the Test Administration Form. Then say:


-  **Turn the page to the beginning of Part 1, and start working immediately. Remember, you have 47 minutes to complete the first part of the booklet.**

Begin timing the 47 minutes for Part 1. Record the current time in Cell (10a) of the Test Administration Form.

Make sure all students begin working on the correct part of the booklet. Remember that you are not allowed to help the students with the test except if they are confused about items involving currency. Refer to your Student Questionnaire Guide for responses to questions about dollars and cents and Zeds. While the students are working, you should move around the room to see that students are working on the correct section of their booklets.

Also, you should be monitoring the students to make sure those students that are restricted from using a calculator in the NAEP items are not using one.

10 minutes before the testing session ends, say the following:

-  **You have 10 minutes left before the break. Make sure you try to finish answering all of the questions in the first part of your booklet before the break.**

After the last 10 minutes have passed, say:

-  **Your time is up. Please close your booklets, and put your pencils down. Do not write anything more. We will now take a short break.**

Record the current time in Cell (10b) of the Test Administration Form.

Break

If the room will be left unattended during the break, collect the booklets from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the first half of the testing session.

Instructions for Part 2

Record the current time in Cell (11a) of the Test Administration Form.

Make sure all the students are seated. When the students are seated and quiet redistribute the test booklets, if necessary. Then, say the following:



Does everybody have their test booklet?

When all problems are resolved and you have the students' attention again, proceed with the instructions for Part 2.



In Part 2, you will answer more questions in mathematics or science. You will have 45 minutes to work on this part of the test.



Read each question carefully and answer it as well as you can. If you are not sure about the answer to a question, choose or write the answer you think is best, and move on to the next question.



Do not start working until you are told to do so.



At the end of the second part of your booklet, you will see a STOP message. If you have completed Part 2 before the time is up, you can review your work on the second part of your booklet or take a book you have with you and read quietly at your desk. Do you have any questions?

When all problems are resolved and you have the students' attention again, record the current time in Cell (11b) of the Test Administration Form and say:



Turn the page to the beginning of Part 2, and start working immediately. You have 45 minutes to complete the second part of the booklet.

Begin timing the 45 minutes for the second part of the session. Record the current time in Cell (12a) of the Test Administration Form.

Remember that you are not allowed to help the students with the test. While the students are working, you should move around the room to see that students are working on the correct section of their booklets. If a student is finished early, make sure that he or she has either a book to read or an activities sheet to work on.

10 minutes before the testing session ends, say the following:



You have 10 minutes left to work on the second part of the booklet. Make sure you try to finish answering all of the questions in the second part of your booklet.

After the last 10 minutes have passed, say:



Your time is up. Please close your booklets, and put your pencils down. Do not write anything more.

Record the current time in Cell (12b) of the Test Administration Form, then say:



Thank you for your work. I'm now going to collect all of your extra materials. You will need to keep your pencil and test booklet. If you have a packet of materials, make sure to place the materials back in the bag. Please place any calculators or extra materials in the upper right corner of your desk and I will come around and collect them.

Collect the calculators and manipulatives. Make sure you account for all items that you distributed.

If the Student Questionnaire is going to be administered now, say:



We will now take a short break. Afterwards, I will ask you to answer a short questionnaire. (Please be back on time.)

If the room will be left unattended during the break, collect the booklets in the envelopes from the students one by one. Keep the booklets secure during the break time. You will then redistribute the booklets and envelopes after the break, just like you did at the beginning of the testing session, making sure each student receives the same test booklet he/she was working on during the testing session.

If the Student Questionnaire is going to be administered at a later time, say:



Please insert the booklet into the envelope it was in when you received it.

Collect all test booklets and keep them secure. Check against the Student Tracking Form to make sure that you have received all test booklets. Use the sequential number you assigned to the front of the envelope to help in this process.

Administering the Student Questionnaire

Before you begin the questionnaire administration:

- ☐ Make sure that you have the corresponding Student Tracking Form and TIMSS Test Administration Form.
- ☐ Make sure all the students in the class are all seated quietly and have a pencil.

The TIMSS-NAEP Link Class Questionnaire Administration Script

When ready, say:



Does everybody have his or her booklet?

If yes, then continue. If not, find out why and proceed as described before.



Now you will complete a short questionnaire. Turn to the colored divider page in your booklet. Do not begin the questionnaire until I tell you to do so.



The directions are printed at the beginning of your questionnaire. I will also read them to you. It is important that you follow the directions very carefully so that you understand how to mark your answers. Now open the questionnaire and turn to the first page titled “Directions.”

Make sure that the students have their questionnaires open to the Directions page before proceeding.



Please follow the directions in your questionnaire as I read them aloud.

Directions



In this booklet, you will find questions about you and what you think. For each question, you should choose the answer you think is best.



Let us take a few minutes to practice the kinds of questions you will answer in this booklet.



Example 1 is one kind of question you will find in this booklet.

Make sure that all students are following along and are looking at Example 1 in their questionnaires.


Example 1

Do you go to school?

*Fill in **one** oval only.*

Yes -- ☐

No -- ☐

-  In Example 1, the question asks, “Do you go to school?” Below this question are a “Yes” and a “No.” Since you all go to school, you should all fill in the oval next to “Yes.”

Give students time to fill in the circle next to “Yes” and make sure they understand how to do it. Once everyone has completed the example, move on to Example 2.

Make sure that all students are following along and are looking at Example 2 in their questionnaires.


-  Example 2 is another kind of question you will find in this booklet.


Example 2

How often do you do these things?

Fill in one oval for each line.


	Every day or almost every day	Once or twice a week	Once or twice a month	Never or almost never
a) I talk with my friends -----	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I play sports -----	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I ride a skateboard -----	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

-  This question asks “How often do you do these things?” Letter (a) says, “I talk with my friends.” You are given four choices for how often you do this: Every day or almost every day; Once or twice a week; Once or twice a month; and Never or almost never.

-  Fill in the oval below your answer. For example, if you talk to your friends every day or almost every day, fill in the first circle under “Every day or almost every day.”

Give students time to fill in their answers to all parts of the Example 2 question and make sure they understand how to answer this kind of question. Once everyone has completed the example, move on to Example 3.

Make sure that all students are following along and are looking at Example 3 in their questionnaires.


-  Example 3 is another kind of question you will find in this booklet.


Example 3

What do you think? Tell how much you agree with these statements.

*Fill in **one** oval for each line.*


	Agree a lot	Agree a little	Disagree a little	Disagree a lot
a) Watching movies is fun -----	①	●	③	④
b) I like eating ice cream -----	●	②	③	④
c) I do not like waking up early -----	①	②	●	④
d) I enjoy doing chores -----	①	②	③	●


 **Example 3 says, “What do you think? Tell how much you agree with these statements.” Letter (a) says, “Watching movies is fun.” You are given four choices for how much you agree with the statement: Agree a lot, Agree a little, Disagree a little, or Disagree a lot.**

 **Fill in the oval below your answer. For example, if you really agree a lot with that, fill in the first oval under “Agree a lot.” If you really disagree a lot, fill in the oval under “Disagree a lot.”**

Give students time to fill in their answers to all parts of the Example 3 question and make sure they understand how to answer this kind of question. Then continue reading the final directions:

 **Read each question carefully, and pick the answer you think is best.**

 **Fill in the oval next to or under your answer.**

 **If you decide to change your answer, completely erase your first choice. Then, fill in the oval next to or under your new answer.**

 **Ask for help if you do not understand something or are not sure how to answer.**

 **Are there any questions before we start?**


If there are questions try to answer them the best you can. If there are no more questions then record the current time in Cell (13a) of the Test Administration Form and proceed with the administration of the questionnaire.

-  **Turn the page to the first question and begin answering this questionnaire. You will have 30 minutes to answer these questions.**




After 30 minutes are up, say:

-  **Please raise your hand if you have finished answering the questions.**

If not all of the students raise their hands, allow for additional time and say:

-  **You will have more time to continue answering this questionnaire. If you have already finished all the questions, then you can use this time to review your answers. Once you have finished, please close your booklet and read quietly at your desk.**

Once all students have finished and have closed their booklets record the current time in Cell (13b) of the Test Administration Form. Then say:

-  **Thank you very much for participating in this study. Your work will help us to learn more about our students and schools.**
-  **Please close your booklets and stay seated.**
-  **Please insert the booklet into the envelope it was in when you received it and seal the envelope closed. Once you have done this, remove the label that contains your name from the envelope. Peel it off and I will collect it.**

Collect all test booklets and envelopes and keep them secure. Check against the Student Tracking Form to make sure that you have received all of them. Use the sequential number you assigned to the front of the envelope to help in this process.

Thank you again for your help in conducting this important international study.