

# Chapter 3



## *Developing the TIMSS 2007 Background Questionnaires*

Ebru Erberber, Alka Arora, and Corinna Preuschoff

### **3.1 Overview**

Student learning is influenced by various contextual factors, such as school resources, teacher characteristics, student attitudes, and home environment. To improve student achievement, it is important to understand the educational and social contexts in which students learn and how these relate to their achievement. Therefore, TIMSS 2007 collected a range of contextual information about teaching and learning in mathematics and science by administering background questionnaires at both the fourth and eighth grades. The questionnaires were based on the contextual framework included in the *TIMSS 2007 Assessment Frameworks* (Mullis, Martin, Ruddock, O’Sullivan, Arora, & Erberber, 2005).

This chapter describes the development of the contextual framework and the questionnaires. Four types of background questionnaires—curriculum, school, teacher, and student—organized around the TIMSS curriculum model were used in TIMSS 2007. The curriculum model has three aspects: the intended, implemented, and attained curriculum. These represent, respectively, the countries’ mathematics and science curricula students are intended to learn; what is actually is taught in classrooms, including how it is taught and who teaches it; and what students have learned. The curriculum questionnaires asked about the structure and content of the intended curriculum in mathematics and science. The school, teacher, and student questionnaires asked about the mathematics and science content actually taught in classrooms, the instructional approaches used, the organization and resources of schools and classrooms, the preparation of teachers, and experiences and attitudes related to mathematics and science.

### 3.2 Updating the Contextual Framework for the Background Questionnaires

Just as the mathematics and science frameworks describe the content and cognitive domains to be assessed in those subjects, the contextual framework for TIMSS 2007 identifies the major characteristics of the educational and social contexts to be examined, with a view toward improving student learning in mathematics and science.

In conjunction with updating the TIMSS mathematics and science assessment frameworks for TIMSS 2007, the contextual framework was revised. The process of updating the contextual framework began at the first National Research Coordinators (NRCs) meeting in February 2005. In this meeting, the existing TIMSS 2003 contextual framework (Mullis, Martin, Smith, Garden, Gregory, Gonzales, Chrostowski, & O'Connor, 2003) was reviewed by the NRCs, who offered their suggestions for areas needing strengthening and revision and to identify potential new areas for inclusion in the contextual framework. In general, the NRCs were satisfied with the existing framework and recommended minor modifications.

Based on the suggestions from the NRCs and the TIMSS & PIRLS International Study Center staff, the following revisions were implemented in the TIMSS 2007 contextual framework:

- A section of school demographics—size, location, and characteristics of the student body—was added.
- The section on school environment was broadened to include social climate, such as the values and culture of the students, teachers, and administrators.
- A new section was added on technology, support, and equipment in order to extract information about factors that limit the use of technology in schools.
- A section for teacher evaluation was included.
- In order not to increase the response burden due to new sections being added, sections on classroom climate and students' prior experience were not included.

The revised contextual framework was reviewed one last time by the NRCs at the second NRC meeting in June 2005. NRCs provided additional input on the contextual framework, and, based on their suggestions, minor revisions were made to the framework. In September 2005, the

TIMSS & PIRLS International Study Center published the *TIMSS 2007 Assessment Frameworks* (Mullis, Martin, Ruddock, O’Sullivan, Arora, & Erberber, 2005).

### 3.3 Updating the TIMSS 2007 Background Questionnaires

TIMSS 2007 included four types of background questionnaires to collect information regarding the contexts in which students learn mathematics and science.

- The *Curriculum Questionnaire* collected information from the participating countries about the organization of the mathematics and science curriculum and the topics intended to be covered up to the fourth and eighth grades. Four versions of this questionnaire were administered: fourth grade mathematics, fourth grade science, eighth grade mathematics, and eighth grade science.
- The *School Questionnaire* asked the students’ school principals to provide information about the school contexts and the resources available for mathematics and science instruction. There were separate versions for fourth and eighth grade.
- The *Teacher Questionnaire* collected information from the students’ teachers about the teachers’ backgrounds, preparation, and professional development. It also asked about instructional activities and collected very detailed information about the subject matter topics taught to students. Because students typically are taught both mathematics and science by the same teacher at the fourth grade, there was a single questionnaire for both subjects. At the eighth grade, there were separate versions for mathematics and science teachers.
- The *Student Questionnaire* addressed students’ home and school lives and their experiences learning mathematics and science. There were separate questionnaires for fourth and eighth grade. At the eighth grade, there were different versions for countries where eighth grade science is taught as a single integrated subject and for countries where it is taught as separate subjects (i.e., biology, chemistry, physics, and earth science).

With each assessment cycle, TIMSS has a special committee of experienced NRCs to help guide the process of updating the questionnaires, called the Questionnaire Item Review Committee<sup>1</sup>. Updating the TIMSS 2007 background questionnaires was a collaborative effort among the

1 The members of the TIMSS 2007 Questionnaire Item Review Committee are provided in Appendix A.

TIMSS & PIRLS International Study Center, the NRCs, the Questionnaire Item Review Committee, and the IEA Data Processing and Research Center. The process included a series of reviews of draft questionnaires, a field test of the questionnaires, a review of field test data, and a revision of the field test instruments for use in the main data collection.

The curriculum, school, teacher, and student questionnaires used in TIMSS 2007 were developed based on the TIMSS 2003 questionnaires. While most of the questions were thematically similar in both assessments, some questions from 2003 were eliminated, others were modified, and some new questions were introduced in 2007 to provide additional information in areas deemed important to the study. In general, every effort was made to streamline the questionnaires in order to limit the response burden.

The development work began at the second NRC meeting in June 2005 when NRCs reviewed the TIMSS 2003 questionnaires in conjunction with the draft TIMSS 2007 contextual framework. NRCs thoroughly reviewed the content of the TIMSS 2003 questionnaires and shared comments in light of 1) the reporting of trend results for the 2007 survey and 2) the addition of new questions. As new questions were added, it was important to also eliminate questions to maintain the same level of response burden.

The Questionnaire Item Review Committee first met in September 2005. Committee members reviewed the contents of the questionnaires, in light of the TIMSS 2003 international reports, the TIMSS 2007 contextual framework, and NRC comments. The Questionnaire Item Review Committee members suggested many improvements, as well as ways to reduce response burden by eliminating some questions thought to be less useful for reporting purposes. Where items were used in the TIMSS 2003 reports, these questions were retained, preferably in the same form, in order to measure trends.

One important decision was to begin moving toward online data collection. For the first time, the *TIMSS 2007 Curriculum Questionnaire* was administered in an online format. Since national adaptations were not necessary for the questionnaire and countries completed it in English, the *Curriculum Questionnaire* was best suited for first experiences with the online data-collection process. The online format allowed for gathering more detailed information about educational policies and the implementation of the mathematics and science curriculum. Also, because the approximately 60 NRCs (a relatively small number of respondents) were responsible for the completion of the curriculum questionnaires, it was felt that the various

rounds of reviews and the online format would result in good information and that it would not be necessary to include the *Curriculum Questionnaire* as part of the field test.

TIMSS & PIRLS International Study Center staff implemented the revisions suggested by the Questionnaire Item Review Committee and then provided the revised draft questionnaires to NRCs for review at the third TIMSS 2007 NRC meeting in November 2005. NRCs suggested a number of improvements to the questionnaires and these revisions were implemented by TIMSS & PIRLS International Study Center staff during December 2005. In particular, the school, teacher, and student questionnaires were prepared for the field test. The field test questionnaires then were provided to NRCs for translation, production, and administration.<sup>2</sup>

The TIMSS 2007 field test was conducted during March and April 2006. One of the primary purposes of the field test was to check across participating countries whether the questionnaires were appropriate for the measurement purposes for which they were designed. Although the questionnaires were adapted from previous versions, it was necessary to field test them, because there were a number of additions and refinements in the 2007 version. In total, 31 countries participated in the grade 4 field test, and 45 countries participated in the grade 8 field test.

After administering the field test, countries prepared their data files and sent them to the IEA Data Processing and Research Center for checking and cleaning. After the field test data were verified and transformed into the international format, they were sent to the TIMSS & PIRLS International Study Center for analysis and review. To facilitate review of the questionnaire data, the TIMSS & PIRLS International Study Center staff prepared data almanacs for each questionnaire that was field tested. For every country that participated, each almanac displayed student-weighted distributions of responses for each item on the questionnaires. For categorical variables, the weighted percentage of respondents choosing each option was shown together with the corresponding average student achievement in mathematics and science. For questions with numeric responses, the mean, mode, and selected percentiles were given. The almanacs were the basic data summaries that were used by TIMSS & PIRLS International Study Center staff, the Questionnaire Item Review Committee, and NRCs in assessing the quality of the field test instruments and in making suggestions for the instruments to be used in the data collection.

2 See Chapter 4 for more information about the translation and verification processes.

At the second Questionnaire Item Review Committee meeting in July 2006, committee members reviewed the field test results for the school, teacher, and student questionnaires, examining the statistics for each item and determining if there were any anomalies. The committee discussed modifications to some items and potential improvements suggested by the TIMSS & PIRLS International Study Center and finally arrived at a set of recommended changes to be brought before the NRCs at their next meeting. The Questionnaire Item Review Committee also proposed some final refinements to the draft curriculum questionnaires.

At the end of July 2006, TIMSS & PIRLS International Study Center staff prepared draft instruments for the main data collection and documented the recommended changes from the field test version for review by NRCs at the fifth NRC meeting in August 2006. The draft instruments were reviewed by NRCs who recommended several additional improvements. Immediately after the NRC meeting, TIMSS & PIRLS International Study Center staff finalized the instruments, and these were provided to NRCs in August for translation, production, and administration of the TIMSS 2007 data collection. This was held from September through December 2006 in countries participating on the Southern Hemisphere schedule and from March through July 2007 in countries participating on the Northern Hemisphere schedule.

As in TIMSS 2003, school, teacher, and student questionnaires were clearly organized into thematic blocks, each with a heading. The design and layout were updated for the TIMSS 2007 data collection. Parallel questions were used in different questionnaires to measure the same constructs from different sources, and, wherever possible, the wording of these questions was identical.

The content of each TIMSS 2007 background questionnaires follows in the next sections.

### 3.3.1 Curriculum Questionnaire

The fourth- and eighth-grade curriculum questionnaires for mathematics and science were provided online to NRCs who were asked to supply information about their nation's mathematics and science curricula in the target grades, drawing on the expertise of curriculum specialists and educators in their countries. The curriculum questionnaires were designed to collect basic information about the organization, content, and implementation of the intended mathematics and science curriculum in each country. They also were designed to determine whether the mathematics and science topics included in the TIMSS 2007 assessment were addressed in the country's intended curriculum through the target grade. New emphasis was placed upon policies of assigning homework and parental involvement. The *Curriculum Questionnaire* also asked about country-level policies regarding entry to primary or secondary school, as they related to the students tested in TIMSS 2007.

The four versions of the *Curriculum Questionnaire* were structured the same and were very similar in content, with the mathematics and science versions tailored to the subject matter and grade level, wherever necessary. One notable difference was that the eighth grade science curriculum questionnaire included a question asking whether eighth grade science was taught as a single integrated subject or as separate science subjects. Also, the mathematics versions of the questionnaire collected information about policies on calculator use.

The complete contents of the TIMSS 2007 mathematics and science curriculum questionnaires at fourth and eighth grades are described in Exhibit 3.1.

**Exhibit 3.1 Content of the TIMSS 2007 Mathematics and Science Curriculum Questionnaires at the Fourth and Eighth Grades**

Item Number				Item Content	Description
Mathematics Grade 4	Mathematics Grade 8	Science Grade 4	Science Grade 8		
1	1	1	1	National curriculum	Whether or not the country has a national mathematics/science curriculum
2	2	2	2	Grade-to-grade structure	Grade-to-grade structure of the primary/lower secondary school mathematics/science curriculum
–	–	–	3	Separate sciences	Whether or not science is taught as separate subjects by eighth grade and the specific subjects and grades taught
3	3	3	4	Year of introduction	Year the current mathematics/science curriculum was introduced
4	4	4	5	Curriculum revision(s)	Whether or not the mathematics/science curriculum is currently under revision
5	5	5	6	Goals, methods, and materials	Goals, objectives, methods, and materials prescribed by mathematics/science curriculum
6	6	–	–	Policy on calculator use	Whether or not the national mathematics curriculum contains statements/policies about the use of calculators
7	7	6	7	Policy on computer use	Whether or not the national mathematics /science curriculum contains statements/policies about the use of computers
8	8	7	8	Emphasis on approaches and processes	How much emphasis the national mathematics/science curriculum places on various instructional approaches and learning processes
9	9	8	9	The teaching of the TIMSS topics	Whether or not the TIMSS mathematics/science topics are included in the national curriculum, the proportion of students intended to be taught the topics, and the grade(s) at which the topics are intended to be taught
10	10	9	10	Differentiation of the curriculum	How the mathematics/science curriculum addresses the issue of students with different levels of ability
11	11	10	11	Form(s) of curriculum	Form(s) the mathematics/science curriculum is made available in
12	12	11	12	Instructional time and homework	Total amount of instructional time, percentage of total instructional time to be devoted to mathematics/science instruction, and whether or not there is a policy to assign mathematics/science homework
13	13	12	13	Remedial instruction	Whether or not there is a policy to provide remedial mathematics/science instruction
14	14	13	14	Teaching requirements	Requirements for being a mathematics/science teacher
15	15	14	15	Licensure process	Whether or not there is a process to license or certify mathematics/science teachers, and what entity licenses the teachers
16	16	15	16	Preservice preparation to teach the curriculum	Whether or not mathematics/science teachers receive specific preparation in how to teach the mathematics/science curriculum as part of preservice education
17	17	16	17	Assistance to implement the curriculum	How do practicing teachers receive assistance to implement the mathematics/science curriculum
18	18	17	18	Communication of curriculum changes to teachers	Methods used to communicate mathematics/science curriculum changes with teachers
19	19	18	19	Communication of curriculum changes to parents	Methods used to communicate mathematics/science curriculum changes with parents
20	20	19	20	Parental involvement	Whether there is a policy to encourage parental involvement
21	21	20	21	Curriculum evaluation	How the implementation of the national curriculum is evaluated
22	22	21	22	Public examinations	Whether or not the country administers examinations in mathematics/science that have consequences for individual students, the authority that administers such examinations, and the grades at which these are given

### 3.3.2 School Questionnaire

Fourth- and eighth-grade school questionnaires were to be completed by the school principal of each school sampled for the study. They were designed to collect information concerning some of the major factors influencing student achievement in mathematics and science. The fourth- and eighth-grade versions of the questionnaire were nearly identical, with three questions addressing mathematics and science instruction separately at the eighth grade. The *School Questionnaire* was designed to be completed in about 30 minutes.

The complete contents of the TIMSS 2007 school questionnaires at fourth and eighth grades are described in Exhibit 3.2.

**Exhibit 3.2 Content of the TIMSS 2007 School Questionnaires at the Fourth and Eighth Grades**

Item Number		Item Content	Description
Grade 4	Grade 8		
1	1	Enrollment	Total school enrollment in all grades and in the target grade
2	2	Community size	Size of the community in which the school is located
3	3	Students' background	Percentage of students who come from economically disadvantaged or affluent homes
4	4	Students' native language	Percentage of students whose native language is the language of the test
5	5	Instructional time	Number of days per year and per week the school is open for instruction and number of hours of total instructional time in a typical day
6	6	Principal's time allocation	Percentage of time principal spends on various activities across the school year
7	7	Parental involvement	Whether or not the school asks parents to participate in various activities
8	8	School climate	Principal's perception of teachers' job satisfaction, parental support and involvement, expectations for student achievement, students' desire to do well in school and their regard for school property
9	9	Tracking in mathematics	Whether or not students are grouped by ability in their mathematics classes
10	10	Enrichment/remedial mathematics	Whether or not the school offers enrichment and remedial courses in mathematics
11	11	Tracking in science	Whether or not students are grouped by ability in their science classes
12	12	Enrichment/ remedial science	Whether or not the school offers enrichment and remedial courses in science
13	13	Professional development	Percentage of teachers who participated in various types of professional development activities during the school year
–	14	Teacher evaluation in mathematics	Whether or not the school uses various procedures in evaluating mathematics teachers
–	15	Teacher evaluation in science	Whether or not the school uses various procedures in evaluating science teachers
14	–	Teacher evaluation	Whether or not the school uses various procedures in evaluating teachers
15	16	Teacher vacancies	Difficulty in filling teacher vacancies in mathematics, science, and computer science/ information technology (fourth grade version does not ask about specific subjects)
16	17	Incentives for teachers	Whether or not the school uses incentives to recruit or retain teachers in mathematics, science, and/or other subjects (fourth grade version does not ask about specific subjects)
17	18	Student behavior	Frequency and severity of various problematic student behaviors occurring in the school
18	19	Instructional resources	Degree to which the school's capacity to provide instruction is affected by shortages or inadequacies of various resources
19	20	Science laboratory	Whether or not the school has a science laboratory and assistance for students conducting experiments
20	21	Computers	Number of computers available for educational purposes and proportion of computers with access to the Internet
21	22	Technology support	Whether there is anyone available to help teachers use information and communication technology for teaching and learning

### 3.3.3 Teacher Questionnaire

The teacher questionnaires were designed to gather information about the classroom contexts for teaching and learning mathematics and science, and about the topics taught in these subjects. For each participating school at the fourth grade, there was one *Teacher Questionnaire* addressed to the classroom teacher of the sampled class. For each sampled school at the eighth grade, a single mathematics class was sampled for the TIMSS 2007 assessment.<sup>3</sup> The mathematics teacher of that class was asked to complete a mathematics teacher questionnaire, and the science teacher(s) of that class was asked to complete a science teacher questionnaire.

Although the general background questions were essentially parallel across versions, questions pertaining to instructional and assessment practices, content coverage, and teachers' views about teaching the subject matter were tailored for mathematics or science. Many questions, such as those related to classroom characteristics and activities and homework and assessment, were specific to the classes sampled for TIMSS.

The TIMSS 2007 teacher questionnaires were designed to take about 45 minutes to complete. Because the fourth grade version includes questions about mathematics and science instruction, other questions that are less relevant at the fourth grade level were eliminated to reduce the response burden. The complete contents of the TIMSS 2007 teacher questionnaires are described in Exhibit 3.3 for the fourth grade and in Exhibit 3.4 for the eighth grade.

3 In some circumstances, it was necessary to sample two classes to yield the desired sample size. See Chapter 5 for more information on sample design.

**Exhibit 3.3 Content of the TIMSS 2007 Teacher Questionnaire at the Fourth Grade**

Item Number	Item Content	Description
1	Age	Teacher's age
2	Gender	Teacher's gender
3	Teaching experience	Number of years as a teacher
4	Teaching license	Whether or not the teacher has a teaching license or certificate
5	Formal education	Highest level of formal education completed by the teacher
6	Major area of study	Teacher's major area of study during postsecondary education
7	Teacher interactions	Frequency of various types of interactions the teacher has with colleagues
8	School safety	Teacher's perception about school safety
9	School facility	Teacher's perception about the adequacy of the school facility
10	School climate	Teacher's perception of job satisfaction, parental support and involvement, expectations for student achievement, students' desire to do well in school and their regard for school property
11	Preparation to teach mathematics	How well prepared the teacher feels to teach the topics included in the TIMSS mathematics test
12	Mathematics class size	Number of students in the sampled class for mathematics and number of those in the fourth grade
13	Time spent teaching mathematics	Minutes per week the teacher teaches mathematics to the sampled class
14	Mathematics textbook	Whether or not a textbook(s) is used as a primary or supplementary resource in teaching mathematics
15	Student learning activities in mathematics	Percentage of time students spend doing various learning activities in a typical week of mathematics lessons
16	Calculator use policy	Whether or not the students are permitted to use calculators during mathematics lessons
17	Calculator use	Frequency with which students use calculators for various learning activities in mathematics
18	Computer availability for mathematics	Whether or not the students have access to computers during mathematics lessons and whether or not computers have access to the Internet
19	Computer use in mathematics	Frequency with which students use computers for various learning activities in mathematics
20	Mathematics content-related activities	Frequency with which the teacher asks students to do various content-related activities in mathematics
21	Emphasis on mathematics content areas	Percentage of time spent on mathematics content areas over the course of the year
22	Mathematics topic coverage	When the students were taught the TIMSS mathematics topics, by content area

**Exhibit 3.3 Content of the TIMSS 2007 Teacher Questionnaire at the Fourth Grade (Continued)**

Item Number	Item Content	Description
23	Mathematics homework	Whether or not the teacher assigns mathematics homework
24	Frequency of mathematics homework	How often the teacher assigns mathematics homework
25	Amount of mathematics homework	Number of minutes it would take an average student to complete a mathematics homework assignment
26	Student factors limiting teaching mathematics	Extent to which the teacher perceives various student factors limit teaching mathematics
27	Professional development in mathematics	Whether the teacher participated in various types of professional development activities for mathematics teaching
28	Preparation to teach science	How well prepared the teacher feels to teach the topics included in the TIMSS science test
29	Science class size	Number of students in the sampled class for science and number of those in the fourth grade
30	Time spent teaching science	Minutes per week the teacher teaches science to the sampled class
31	Computer availability for science	Whether or not the students have access to computers during science lessons and whether or not computers have access to the Internet
32	Computer use in science	Frequency with which students use computers for various learning activities in science
33	Science content-related activities	Frequency with which the teacher asks students to do various content-related activities in science
34	Student learning activities in science	Percentage of time students spend doing various learning activities in a typical week of science lessons
35	Science textbook	Whether or not a textbook(s) is used as a primary or supplementary resource in teaching science
36	Science topic coverage	When students were taught the TIMSS science topics, by content area
37	Science homework	Whether or not the teacher assigns science homework
38	Frequency of science homework	How often the teacher assigns science homework
39	Amount of science homework	Number of minutes it would take an average student to complete a science homework assignment
40	Student factors limiting teaching science	Extent to which the teacher perceives various student factors limit teaching science
41	Professional development in science	Whether or not the teacher participated in various types of professional development activities for science teaching

**Exhibit 3.4 Content of the TIMSS 2007 Mathematics and Science Teacher Questionnaires at the Eighth Grade**

Item Number		Item Content	Description
Mathematics Teacher Questionnaire	Science Teacher Questionnaire		
1	1	Age	Teacher's age
2	2	Gender	Teacher's gender
3	3	Teaching experience	Number of years as a teacher
4	4	Formal education	Highest level of formal education completed by the teacher
5	5	Major area of study	Teacher's major area of study during postsecondary education
6	6	Teaching license	Whether or not the teacher has a teaching license or certificate
7	7	Preparation to teach	How well prepared the teacher feels to teach the topics included in the TIMSS mathematics/science test
8	8	Teacher interactions	Frequency of various types of interactions the teacher has with colleagues
9	9	Professional development	Whether the teacher participated in various types of professional development activities
10	10	School safety	Teacher's perception about school safety
11	11	School facility	Teacher's perception about the adequacy of the school facility
12	12	School climate	Teacher's perception of job satisfaction, parental support and involvement, expectations for student achievement, students' desire to do well in school and their regard for school property
13	13	Class size	Number of students in the sampled class
14	14	Time spent teaching subject	Minutes per week the teacher teaches mathematics/science to the sampled class
15	15	Textbook	Whether or not a textbook(s) is used as a primary or supplementary resource
16	16	Student learning activities	Percentage of time students spend doing various learning activities in a typical week
17	17	Content-related activities	Frequency with which the teacher asks students to do various content-related activities in mathematics/science
18	18	Factors limiting teaching	Extent to which the teacher perceives various student and resource factors to limit teaching
19	19	Emphasis on content areas	Percentage of time spent on mathematics/science content areas over the course of the year
20	20	Topic coverage	When students were taught the TIMSS mathematics/science topics, by content area
21	–	Calculator use policy	Whether or not the students are permitted to use calculators during mathematics lessons
22	–	Calculator use	Frequency with which the students use calculators for various learning activities in mathematics
23	21	Computer availability	Whether or not the students have access to computers during mathematics/science lessons and whether or not computers have access to the Internet
24	22	Computer use	Frequency with which the students use computers for various learning activities in mathematics/science
25	23	Homework	Whether or not the teacher assigns mathematics/science homework
26	24	Frequency of homework	How often the teacher assigns mathematics/science homework
27	25	Amount of homework	Number of minutes it would take an average student to complete a mathematics/science homework assignment
28	26	Type of homework	Frequency with which the teacher assigns various types of homework
29	27	Use of homework	How often the teacher uses mathematics/science homework for various purposes
30	28	Sources to monitor progress	Emphasis teacher places on sources to monitor students' progress in mathematics/science
31	29	Assessment	Frequency with which the teacher gives a mathematics/science test or examination
32	30	Question format	Item formats the teacher typically uses in mathematics/science tests or examinations
39	31	Type of questions	Types of questions the teacher uses in mathematics/science tests or examinations

### 3.3.4 Student Questionnaire

Each student in the sampled fourth- and eighth-grade TIMSS classes completed a *Student Questionnaire*. This questionnaire asked about the student's home background and resources for learning, attitude about mathematics and science, and experiences in learning these subjects. The fourth- and eighth-grade versions of the *Student Questionnaire* were thematically and organizationally similar to each other. While some questions were identical in the two versions, for other questions, the language was simplified in the fourth grade version or the specific content of the question was altered to be appropriate to this grade.

As in TIMSS 1999 and 2003, two versions of the eighth grade questionnaire were used, a *general science* version, intended for countries where eighth grade science is taught as a single integrated subject, and a *separate science subjects* version, intended for countries where eighth grade science is taught as separate subjects (i.e., biology, earth science, chemistry, and physics). Countries administered the version that was consistent with the way in which science instruction was organized at the eighth grade. In the general science version, science-related questions pertaining to students' attitudes and classroom activities were based on single questions asking about "science." Students responded in terms of the "general or integrated science" course they were taking. In the separate science subjects version, the same questions were asked about each science subject area, and students responded with respect to each science course they were taking. This structure accommodated the diverse systems that participated in TIMSS.

The TIMSS 2007 student questionnaires were designed to take about 30 minutes to complete. The complete contents of the TIMSS 2007 student questionnaires are described in Exhibit 3.5 for the fourth grade and in Exhibit 3.6 for the eighth grade.

**Exhibit 3.5 Content of the TIMSS 2007 Student Questionnaire at the Fourth Grade**

Item Number	Item Content	Description
1	Age	Month and year of student's birth
2	Gender	Student's gender
3	Language	Student's frequency of use of the language of the test at home
4	Books in the home	Number of books in the student's home
5	Home possessions	Educational resources and general possessions in the student's home
6	Liking mathematics	How much the student likes and feels competent at mathematics
7	Learning activities in mathematics	Frequency with which student does various learning activities in mathematics lessons
8	Liking science	How much the student likes and feels competent at science
9	Learning activities in science	Frequency with which student does various learning activities in science lessons
10	Computers	Whether or not student uses a computer, where student uses it, and frequency with which student uses a computer for schoolwork
11	School climate	Student's affinity for school and perception of other students' motivation in school and teachers' expectations
12	Safety in school	Whether or not the student experienced being the object of problematic behaviors by other students
13	Out-of-school activities	Frequency with which student does various nonacademic activities and homework outside of school
14	Mathematics homework	Frequency and amount of mathematics homework
15	Science homework	Frequency and amount of science homework
16	Parents born in country	Whether or not mother and father were born in country
17	Student born in country	Whether or not student was born in country and if not, the age at which the student emigrated

**Exhibit 3.6** Content of the TIMSS 2007 Student Questionnaire at the Eighth Grade

Item Number		Item Content	Description
General science version	Separate science subjects version		
1	1	Age	Month and year of student's birth
2	2	Gender	Student's gender
3	3	Language	Student's frequency of use of the language of the test at home
4	4	Books in the home	Number of books in the student's home
5	5	Home possessions	Educational resources and general possessions in the student's home
6	6	Parents' education	Highest level of education completed by mother and father
7	7	Educational expectations	Level of education the student expects to complete
8	8	Liking mathematics	How much the student likes and feels competent at mathematics
9	9	Valuing mathematics	Importance and value the student attributes to mathematics
10	10	Learning activities in mathematics	Frequency with which student does various learning activities in mathematics lessons
11	–	Liking science	How much the student likes and feels competent at science
12	–	Valuing science	Importance and value the student attributes to science
13	–	Learning activities in science	Frequency with which student does various learning activities in science lessons
–	11	Study biology	Whether or not the student is studying biology this year
–	12	Liking biology	How much the student likes and feels competent at biology
–	13	Valuing biology	Importance and value the student attributes to biology
–	14	Learning activities in biology	Frequency with which student does various learning activities in biology lessons
–	15	Study earth science	Whether or not the student is studying earth science this year
–	16	Liking earth science	How much the student likes and feels competent at earth science
–	17	Valuing earth science	Importance and value the student attributes to earth science
–	18	Learning activities in earth science	Frequency with which student does various learning activities in earth science lessons
–	19	Study chemistry	Whether or not the student is studying chemistry this year
–	20	Liking chemistry	How much the student likes and feels competent at chemistry
–	21	Valuing chemistry	Importance and value the student attributes to chemistry
–	22	Learning activities in chemistry	Frequency with which student does various learning activities in chemistry lessons
–	23	Study physics	Whether or not the student is studying physics this year
–	24	Liking physics	How much the student likes and feels competent at physics
–	25	Valuing physics	Importance and value the student attributes to physics
–	26	Learning activities in physics	Frequency with which student does various learning activities in physics lessons
14	27	Computers	Whether or not student uses a computer, where student uses it, and frequency with which student uses a computer in mathematics and science
15	28	School climate	Student's affinity for school, perception of other students' motivation in school, and teachers' expectations
16	29	Safety in school	Whether or not the student experienced being the object of problematic behaviors by other students
17	30	Out-of-school activities	Frequency with which student does various nonacademic activities and homework outside of school
18	31	Mathematics homework	Frequency and amount of mathematics homework
19	31	Science homework	Frequency and amount of science homework
20	32	Parents born in country	Whether or not mother and father were born in country
21	33	Student born in country	Whether or not student was born in country and if not, the age at which the student emigrated

## References

---

- Mullis, I.V.S., Martin, M.O., Ruddock, G.J., O'Sullivan, C.Y., Arora, A., & Erberber, E. (2005). *TIMSS 2007 assessment frameworks*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.
- Mullis, I.V.S., Martin, M.O., Smith, T.A., Garden, R.A., Gregory, K.D., Gonzalez, E.J., Chrostowski, S.J., & O'Connor, K.M. (2003). *TIMSS assessment frameworks and specifications 2003* (2nd ed.). Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.