TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS

TIMSS Advanced 2015 User Guide for the International Database

SUPPLEMENT 1

International Version of the
TIMSS Advanced 2015 Context Questionnaires

IEA
TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Supplement 1

International Version of the TIMSS Advanced 2015 Context Questionnaires

Overview

The TIMSS Advanced 2015 International Database includes data for all questionnaires administered as part of the TIMSS Advanced 2015 assessment. This supplement contains the international version of the TIMSS Advanced 2015 context questionnaires in the following 7 sections:

- Section 1: Advanced Mathematics Student Questionnaire
- Section 2: Physics Student Questionnaire
- Section 3: Advanced Mathematics Teacher Questionnaire
- Section 4: Physics Teacher Questionnaire
- Section 5: School Questionnaire – Advanced Mathematics & Physics
- Section 6: Advanced Mathematics Curriculum Questionnaire
- Section 7: Physics Curriculum Questionnaire

Each section contains a table that lists detailed information for each question, followed by the international version of the questionnaire with variable names labeled in the margin. The questions included in the school questionnaire are the same across advanced mathematics and physics. However, each school questionnaire item corresponds to two variables—one for advanced mathematics and another for physics. As such, only one table for the school questionnaire is presented that lists the variable names for both subjects.

Exhibits S1.1 through S1.7 list the questions for each of the TIMSS Advanced 2015 questionnaires. For each question, the exhibits provide the questionnaire number, the corresponding variable name, and the question text, as well as whether the question is considered to be 'trend'—whether a comparable question was asked in 2008.

The TIMSS Advanced 2015 questionnaires were designed to provide an opportunity for individual countries to make modifications to some questions or response options. This allowed countries to include the appropriate wording or options most consistent with their own national systems. In the international version of the questionnaires, such questions contain instructions to the National Research Coordinators (NRCs) to substitute the appropriate wording for their country and/or modify or delete any inappropriate questions or options. These instructions were indicated in the questionnaires by text inserted within carets (e.g., <country-specific>). The NRCs were to substitute, if necessary, an appropriate national adaptation that would retain the same basic interpretation as the text within carets. These national adaptations of the context questionnaires are documented in Supplement 2.

TIMSS Advanced 2015

SECTION 1: ADVANCED MATHEMATICS STUDENT QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.1: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Student Questionnaire

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQG-01	MSBG01	Are you female or male?	MS2GSEX	Modified wording in 2015
SQG-02a	MSBG02A	When were you born? Month	MS2GBRTM	
SQG-02b	MSBG02B	When were you born? Year	MS2GBRTY	
SQG-03	MSBG03	How often do you speak <language of test> at home?	MS2GOLAN	
SQG-04	MSBG04	About how many books are there in your home? (Do not count magazines, newspapers, or your school books.)	MS2GBOOK	
SQG-05	MSBG05	How many digital information devices are there in your home? Count computers, tablets, smartphones, smart TVs, and e-readers.		
SQG-06a	MSBG06A	Do you have any of these things? Your own computer	MS2GTH03	Modified wording in 2015
SQG-06b	MSBG06B	Do you have any of these things? Your own tablet		
SQG-06c	MSBG06C	Do you have any of these things? Your own smartphone		
SQG-06d	MSBG06D	Do you have any of these things? Your own graphing calculator	MS2GTH04	Modified wording in 2015
SQG-06e	MSBG06E	Do you have any of these things? A gaming system		
SQG-06f	MSBG06F	Do you have any of these things? Study desk/table for your use	MS2GTH05	Modified wording in 2015
SQG-06g	MSBG06G	Do you have any of these things? Your own room		
SQG-06h	MSBG06H	Do you have any of these things? <country-specific indicator of wealth>		
SQG-06i	MSBG06I	Do you have any of these things? <country-specific indicator of wealth>		
SQG-06j	MSBG06J	Do you have any of these things? <country-specific indicator of wealth>		
SQG-07A	MSBG07A	What is the highest level of education completed by your mother (or stepmother or female guardian)?	MS2GHLEM	Modified response options in 2015
SQG-07B	MSBG07B	What is the highest level of education completed by your father (or stepfather or male guardian)?	MS2GHLEF	Modified response options in 2015
SQG-08a	MSBG08A	What kind of work do your father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs? Your father		
SQG-08b	MSBG08B	What kind of work do your father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs? Your mother		
SQG-09	MSBG09	How far in your education do you expect to go?		
SQG-10a	MSBG10A	If you plan to continue your education, which area(s) do you intend to study? Mathematics or Statistics		
SQG-10b	MSBG10B	If you plan to continue your education, which area(s) do you intend to study? Physics		
SQG-10c	MSBG10C	If you plan to continue your education, which area(s) do you intend to study? Chemistry		
SQG-10d	MSBG10D	If you plan to continue your education, which area(s) do you intend to study? Biological and Biomedical Sciences (e.g., dentistry, medicine, nursing, pharmacology, veterinary medicine)		
SQG-10e	MSBG10E	If you plan to continue your education, which area(s) do you intend to study? Engineering and Engineering Technologies (e.g., aerospace engineering, chemical engineering, civil engineering, electrical engineering, mechanical engineering)		
SQG-10f	MSBG10F	If you plan to continue your education, which area(s) do you intend to study? Computer and Information Sciences		
SQG-10g	MSBG10G	If you plan to continue your education, which area(s) do you intend to study? Education		
SQG-10h	MSBG10H	If you plan to continue your education, which area(s) do you intend to study? Business (e.g., accounting, marketing, administration, finance, management)		

Exhibit S1.1: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQG-10i	MSBG10I	If you plan to continue your education, which area(s) do you intend to study? Law		
SQG-10j	MSBG10J	If you plan to continue your education, which area(s) do you intend to study? Social Sciences (e.g., sociology, political science, economics, psychology)		
SQG-10k	MSBG10K	If you plan to continue your education, which area(s) do you intend to study? Arts and Humanities (e.g., art, language, literature, history, philosophy)		
SQG-10l	MSBG10L	If you plan to continue your education, which area(s) do you intend to study? Other Science Fields of Study		
SQG-10m	MSBG10M	If you plan to continue your education, which area(s) do you intend to study? Other Non-science Fields of Study		
SQG-11a	MSBG11A	In the future, do you want to work in any of the following professional fields? Education (e.g., teacher, university professor)		
SQG-11b	MSBG11B	In the future, do you want to work in any of the following professional fields? Engineering and Engineering Technologies (e.g., aerospace engineer, chemical engineer, civil engineer, electrical engineer, mechanical engineer)		
SQG-11c	MSBG11C	In the future, do you want to work in any of the following professional fields? Computer and Information Sciences (e.g., database administrator, network administrator, software or application developer, systems analyst)		
SQG-11d	MSBG11D	In the future, do you want to work in any of the following professional fields? Finance/Banking		
SQG-11e	MSBG11E	In the future, do you want to work in any of the following professional fields? Biological and Biomedical Sciences (e.g., biomedical engineer, biochemist, biophysicist, dentist, medical doctor, nurse, veterinarian)		
SQG-11f	MSBG11F	In the future, do you want to work in any of the following professional fields? Environmental Sciences		
SQG-11g	MSBG11G	In the future, do you want to work in any of the following professional fields? Agriculture and Agricultural Sciences		
SQG-11h	MSBG11H	In the future, do you want to work in any of the following professional fields? Actuarial Sciences		
SQG-11i	MSBG11I	In the future, do you want to work in any of the following professional fields? Other Fields		
SQG-12A	MSBG12A	Was your mother (or stepmother or female guardian) born in <country>?	MS2GMBRN	Modified response options in 2015
SQG-12B	MSBG12B	Was your father (or stepfather or male guardian) born in <country>?	MS2GFBRN	Modified response options in 2015
SQG-13A	MSBG13A	Were you born in <country>?	MS2GBORN	
SQG-13B	MSBG13B	If you were not born in <country>, how old were you when you came to <country>?	MS2GBRNC	Modified response options in 2015
SQM-14	MSBM14	How much time do you spend in mathematics class each week? (minutes per week)	MS2MHMMW	
SQM-15	MSBM15	How much time do you spend on mathematics outside of class each week? (minutes per week)		
SQM-16A	MSBM16A	During the school year, do you work at a paid job on a regular basis?		
SQM-16B	MSBM16B	(If Yes) How much time do you spend working at the paid job each week? (minutes per week)		
SQM-17A	MSBM17A	During the last 12 months, have you attended extra lessons or tutoring not provided by the school in advanced mathematics?		
SQM-17Ba	MSBM17BA	(If Yes) Why did you attend these extra lessons or tutoring? To excel in class		
SQM-17Bb	MSBM17BB	(If Yes) Why did you attend these extra lessons or tutoring? To keep up in class		
SQM-17Bc	MSBM17BC	(If Yes) Why did you attend these extra lessons or tutoring? To do well on an examination		

Exhibit S1.1: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQM-17C	MSBM17C	(If Yes) For how many of the last 12 months have you attended extra lessons or tutoring in advanced mathematics?		
SQM-18a	MSBM18A	How much do you agree with these statements about your advanced mathematics lessons? The teacher clearly communicates the purpose of each mathematics lesson		
SQM-18b	MSBM18B	How much do you agree with these statements about your advanced mathematics lessons? I know what my teacher expects me to do		
SQM-18c	MSBM18C	How much do you agree with these statements about your advanced mathematics lessons? My teacher is easy to understand		
SQM-18d	MSBM18D	How much do you agree with these statements about your advanced mathematics lessons? I am interested in what my teacher says		
SQM-18e	MSBM18E	How much do you agree with these statements about your advanced mathematics lessons? My teacher gives me interesting things to do		
SQM-18f	MSBM18F	How much do you agree with these statements about your advanced mathematics lessons? My teacher asks me thought provoking questions		
SQM-18g	MSBM18G	How much do you agree with these statements about your advanced mathematics lessons? My teacher has clear answers to my questions		
SQM-18h	MSBM18H	How much do you agree with these statements about your advanced mathematics lessons? My teacher links new content to what I already know		
SQM-18i	MSBM18I	How much do you agree with these statements about your advanced mathematics lessons? My teacher is good at explaining advanced mathematics		
SQM-18j	MSBM18J	How much do you agree with these statements about your advanced mathematics lessons? My teacher provides the opportunity for me to show what I have learned		
SQM-18k	MSBM18K	How much do you agree with these statements about your advanced mathematics lessons? My teacher encourages me to keep working on advanced mathematics problems until I solve them		
SQM-18l	MSBM18L	How much do you agree with these statements about your advanced mathematics lessons? My teacher provides helpful feedback on my schoolwork (including homework)		
SQM-18m	MSBM18M	How much do you agree with these statements about your advanced mathematics lessons? My teacher uses a variety of teaching methods, tasks, and activities to help us learn		
SQM-18n	MSBM18N	How much do you agree with these statements about your advanced mathematics lessons? My teacher believes that I can learn difficult advanced mathematics material		
SQM-18o	MSBM18O	How much do you agree with these statements about your advanced mathematics lessons? I like the way my teacher teaches mathematics		
SQM-19a	MSBM19A	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Access the textbook or other course materials		
SQM-19b	MSBM19B	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Access assignments posted online by my teacher		
SQM-19c	MSBM19C	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Collaborate with classmates on mathematics assignments or projects		
SQM-19d	MSBM19D	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Communicate with the teacher		

Exhibit S1.1: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQM-19e	MSBM19E	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Discuss mathematics topics with other students		
SQM-19f	MSBM19F	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Find information, articles, or tutorials to aid in understanding mathematics concepts		
SQM-19g	MSBM19G	Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)? Find information, articles, or tutorials to aid in solving mathematics problems		
SQM-20a	MSBM20A	How much do you agree with these statements about the mathematics you are studying? When I do mathematics problems, I sometimes get completely absorbed		
SQM-20b	MSBM20B	How much do you agree with these statements about the mathematics you are studying? I get a sense of satisfaction when I solve mathematics problems		
SQM-20c	MSBM20C	How much do you agree with these statements about the mathematics you are studying? I feel bored when I do my mathematics schoolwork		
SQM-20d	MSBM20D	How much do you agree with these statements about the mathematics you are studying? I like studying for my mathematics class outside of school		
SQM-20e	MSBM20E	How much do you agree with these statements about the mathematics you are studying? It is interesting to learn mathematics theory		
SQM-20f	MSBM20F	How much do you agree with these statements about the mathematics you are studying? I dread my mathematics class		
SQM-20g	MSBM20G	How much do you agree with these statements about the mathematics you are studying? I am studying mathematics because I like to learn new things		
SQM-20h	MSBM20H	How much do you agree with these statements about the mathematics you are studying? I enjoy figuring out challenging mathematics		
SQM-20i	MSBM20I	How much do you agree with these statements about the mathematics you are studying? Mathematics is one of my favorite subjects		
SQM-20j	MSBM20J	How much do you agree with these statements about the mathematics you are studying? Jobs that require advanced mathematics skills seem interesting to me		
SQM-20k	MSBM20K	How much do you agree with these statements about the mathematics you are studying? I wish I did not have to study mathematics		
SQM-20l	MSBM20L	How much do you agree with these statements about the mathematics you are studying? I enjoy thinking about the world in terms of mathematical relationships		
SQM-21a	MSBM21A	How much do you agree with these statements about the mathematics you are studying? Learning mathematics will help me get ahead in the world		
SQM-21b	MSBM21B	How much do you agree with these statements about the mathematics you are studying? It is important to do well in my mathematics class		
SQM-21c	MSBM21C	How much do you agree with these statements about the mathematics you are studying? The mathematics I am studying is not useful for my future		
SQM-21d	MSBM21D	How much do you agree with these statements about the mathematics you are studying? My parents are pleased that I am taking advanced mathematics		
SQM-21e	MSBM21E	How much do you agree with these statements about the mathematics you are studying? Doing well in mathematics will help me get into the <university> of my choice		

Exhibit S1.1: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQM-21f	MSBM21F	How much do you agree with these statements about the mathematics you are studying? Learning advanced mathematics does not seem to be a worthwhile exercise		
SQM-21g	MSBM21G	How much do you agree with these statements about the mathematics you are studying? My parents think that it is important that I do well in my mathematics class		
SQM-21h	MSBM21H	How much do you agree with these statements about the mathematics you are studying? I like telling people I am studying advanced mathematics		
SQM-21i	MSBM21I	How much do you agree with these statements about the mathematics you are studying? Learning advanced mathematics will give me more job opportunities		
SQM-22a	MSBM22A	What do you think about your school? Tell how much you agree with these statements. I enjoy school		
SQM-22b	MSBM22B	What do you think about your school? Tell how much you agree with these statements. I feel safe when I am at school		
SQM-22c	MSBM22C	What do you think about your school? Tell how much you agree with these statements. I feel like I belong at this school		
SQM-22d	MSBM22D	What do you think about your school? Tell how much you agree with these statements. I like to see my classmates at school		
SQM-22e	MSBM22E	What do you think about your school? Tell how much you agree with these statements. Teachers at my school are fair to me		
SQM-22f	MSBM22F	What do you think about your school? Tell how much you agree with these statements. I am proud to go to this school		
SQM-22g	MSBM22G	What do you think about your school? Tell how much you agree with these statements. I learn a lot in school		
SQM-22h	MSBM22H	What do you think about your school? Tell how much you agree with these statements. My classmates respect students who excel in school subjects		
SQM-22i	MSBM22I	What do you think about your school? Tell how much you agree with these statements. My classmates respect students who struggle learning school subjects		
SQM-23a	MSBM23A	During this school year, how often have other students from your school done any of the following things to you? Made fun of me or called me names		
SQM-23b	MSBM23B	During this school year, how often have other students from your school done any of the following things to you? Excluded me from their activities		
SQM-23c	MSBM23C	During this school year, how often have other students from your school done any of the following things to you? Spread lies about me		
SQM-23d	MSBM23D	During this school year, how often have other students from your school done any of the following things to you? Stole something from me		
SQM-23e	MSBM23E	During this school year, how often have other students from your school done any of the following things to you? Hit or hurt me		
SQM-23f	MSBM23F	During this school year, how often have other students from your school done any of the following things to you? Made me do things I didn't want to do		
SQM-23g	MSBM23G	During this school year, how often have other students from your school done any of the following things to you? Posted embarrassing things about me online		
SQM-23h	MSBM23H	During this school year, how often have other students from your school done any of the following things to you? Threatened me		

TIMSS Advanced 2015

Identification Label

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Student Questionnaire Advanced Mathematics

<TIMSS National Research Center Name>
<Address>

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Directions

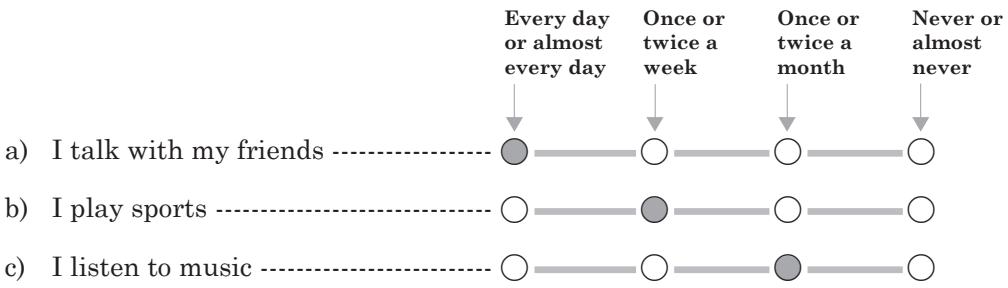
In this booklet, you will find questions about yourself. Some questions ask for facts while other questions ask for your opinion.

Each question is followed by a number of answers. Shade in the circle next to or under the answer of your choice as shown in the example below.

Example

How often do you do these things?

*Fill **one** circle for each line.*



- 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, draw an X through your first answer, like this: ⊗. Then, fill in the circle next to or under your new answer.
- Ask for help if you do not understand something or are not sure how to answer.

About you

1

MSBG01

Are you female or male?

*Fill **one** circle only.*

Female -- ◯

Male -- ◯

2

MSBG02A
MSBG02B

When were you born?

Fill the circles next to the month and year you were born.

a) Month		b) Year	
January -- ◯		1993 -- ◯	
February -- ◯		1994 -- ◯	
March -- ◯		1995 -- ◯	
April -- ◯		1996 -- ◯	
May -- ◯		1997 -- ◯	
June -- ◯		1998 -- ◯	
July -- ◯		1999 -- ◯	
August -- ◯		2000 -- ◯	
September -- ◯		2001 -- ◯	
October -- ◯		Other -- ◯	
November -- ◯			
December -- ◯			

3

MSBG03

How often do you speak <language of test> at home?

*Fill **one** circle only.*

- Always --◯
- Almost always --◯
- Sometimes --◯
- Never --◯

4

MSBG04

About how many books are there in your home? (Do not count magazines, newspapers, or your school books.)

*Fill **one** circle only.*

- None or very few (0–10 books) --◯
- Enough to fill one shelf (11–25 books) --◯
- Enough to fill one bookcase (26–100 books) --◯
- Enough to fill two bookcases (101–200 books) --◯
- Enough to fill three or more bookcases (more than 200) --◯

5

MSBG05 **How many digital information devices are there in your home? Count computers, tablets, smartphones, smart TVs, and e-readers. (Do not count other devices.)**

*Fill **one** circle only.*

- None -- ◯
- 1-3 devices -- ◯
- 4-6 devices -- ◯
- 7-10 devices -- ◯
- More than 10 devices -- ◯

6

Do you have any of these things?

*Fill **one** circle for each line.*

		Yes	No
MSBG06A	a) Your own computer	◯	◯
MSBG06B	b) Your own tablet	◯	◯
MSBG06C	c) Your own smartphone	◯	◯
MSBG06D	d) Your own graphing calculator	◯	◯
MSBG06E	e) A gaming system (e.g., PlayStation®, Wii®, XBox®)	◯	◯
MSBG06F	f) Study desk/table for your use	◯	◯
MSBG06G	g) Your own room	◯	◯
MSBG06H	h) <country-specific indicator of wealth>	◯	◯
MSBG06I	i) <country-specific indicator of wealth>	◯	◯
MSBG06J	j) <country-specific indicator of wealth>	◯	◯

7

MSBG07A **A. What is the highest level of education completed by your mother (or stepmother or female guardian)?**

*Fill **one** circle only.*

- Some <Primary education—ISCED Level 1 or Lower secondary education—ISCED Level 2> or did not go to school ◯
- <Lower secondary education—ISCED Level 2> ◯
- <Upper secondary education—ISCED Level 3> ◯
- <Post-secondary, non-tertiary education—ISCED Level 4> ◯
- <Short-cycle tertiary education—ISCED Level 5> ◯
- <Bachelor's or equivalent level—ISCED Level 6> ◯
- <Master's or equivalent level—ISCED Level 7> ◯
- <Doctor or equivalent level—ISCED Level 8> ◯
- I don't know ◯

MSBG07B **B. What is the highest level of education completed by your father (or stepfather or male guardian)?**

*Fill **one** circle only.*

- Some <Primary education—ISCED Level 1 or Lower secondary education—ISCED Level 2> or did not go to school ◯
- <Lower secondary education—ISCED Level 2> ◯
- <Upper secondary education—ISCED Level 3> ◯
- <Post-secondary, non-tertiary education—ISCED Level 4> ◯
- <Short-cycle tertiary education—ISCED Level 5> ◯
- <Bachelor's or equivalent level—ISCED Level 6> ◯
- <Master's or equivalent level—ISCED Level 7> ◯
- <Doctor or equivalent level—ISCED Level 8> ◯
- I don't know ◯

8

What kind of work do your father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs?

For each, fill the circle for the job category that best describes what he/she does. Each category has a few examples to help you decide the correct category. If your father or mother is not working now, think about the last job he/she had.

*Fill **one** circle in each column.*

MSBG08A
MSBG08B

	Your father	Your mother
a) Has never worked for pay	○	○
b) Small Business Owner Includes owners of small businesses (fewer than 25 employees) such as retail shops, services, restaurants	○	○
c) Clerk Includes office clerks; secretaries; typists; data entry operators; customer service clerks	○	○
d) Service or Sales Worker Includes travel attendants; restaurant service workers; personal care workers; protective service workers; junior military and police; salespersons; street vendors	○	○
e) Skilled Agricultural or Fishery Worker Includes farmers; forestry workers; fishery workers; hunters and trappers	○	○
f) Craft or Trade Worker Includes builders, carpenters, plumbers, electricians, metal workers; machine mechanics; handicraft workers	○	○

Continued on next page →

8 (continued)

	Your father	Your mother
g) Plant or Machine Operator Includes plant and machine operators; assembly-line operators; motor-vehicle drivers	○	○
h) General Laborers Includes domestic helpers and cleaners; building caretakers; messengers, porters, and doorkeepers; farm, fishery, agricultural, and construction workers	○	○
i) Corporate Manager or Senior Official Includes corporate managers such as managers of large companies (25 or more employees) or managers of departments within large companies; legislators or senior government officials; senior officials of special-interest organizations; military officers	○	○
j) Professional Includes scientists; mathematicians; computer scientists; architects; engineers; life science and health professionals; teachers; legal professionals; social scientists; writers and artists; religious professionals	○	○
k) Technician or Associate Professional Includes science, engineering, and computer associates and technicians; life science and health technicians and assistants; teacher aides; finance and sales associate professionals; business service agents; administrative assistants	○	○
l) I don't know	○	○

9

MSBG09 **How far in your education do you expect to go?**

*Fill **one** circle only.*

<Upper secondary education—ISCED Level 3> -- ◯

<Post-secondary, non-tertiary education—ISCED Level 4> -- ◯

<Short-cycle tertiary education—ISCED Level 5> -- ◯

<Bachelor's or equivalent level—ISCED Level 6> -- ◯

<Master's or equivalent level—ISCED Level 7> -- ◯

<Doctor or equivalent level—ISCED Level 8> -- ◯

10

If you plan to continue your education, which area(s) do you intend to study?

Fill the circle(s) that apply.

MSBG10A	Mathematics or Statistics ◯
MSBG10B	Physics ◯
MSBG10C	Chemistry ◯
MSBG10D	Biological and Biomedical Sciences (e.g., dentistry, medicine, nursing, pharmacology, veterinary medicine) ◯
MSBG10E	Engineering and Engineering Technologies (e.g., aerospace engineering, chemical engineering, civil engineering, electrical engineering, mechanical engineering) ◯
MSBG10F	Computer and Information Sciences ◯
MSBG10G	Education ◯
MSBG10H	Business (e.g., accounting, marketing, administration, finance, management) ◯
MSBG10I	Law ◯
MSBG10J	Social Sciences (e.g., sociology, political science, economics, psychology) ◯
MSBG10K	Arts and Humanities (e.g., art, language, literature, history, philosophy) ◯
MSBG10L	Other Science Fields of Study ◯
MSBG10M	Other Non-science Fields of Study ◯

11

In the future, do you want to work in any of the following professional fields?

*Fill **one** circle for each line.*

		Yes	Maybe	No
MSBG11A	a) Education (e.g., teacher, university professor)	○	○	○
MSBG11B	b) Engineering and Engineering Technologies (e.g., aerospace engineer, chemical engineer, civil engineer, electrical engineer, mechanical engineer)	○	○	○
MSBG11C	c) Computer and Information Sciences (e.g., database administrator, network administrator, software or application developer, systems analyst)	○	○	○
MSBG11D	d) Finance/Banking	○	○	○
MSBG11E	e) Biological and Biomedical Sciences (e.g., biomedical engineer, biochemist, biophysicist, dentist, medical doctor, nurse, veterinarian)	○	○	○
MSBG11F	f) Environmental Sciences	○	○	○
MSBG11G	g) Agriculture and Agricultural Sciences	○	○	○
MSBG11H	h) Actuarial Sciences	○	○	○
MSBG11I	i) Other Fields	○	○	○

12

MSBG12A **A. Was your mother (or stepmother or female guardian) born in <country>?**

*Fill **one** circle only.*

Yes --◯

No --◯

I don't know --◯

MSBG12B **B. Was your father (or stepfather or male guardian) born in <country>?**

*Fill **one** circle only.*

Yes --◯

No --◯

I don't know --◯

13

MSBG13A **A. Were you born in <country>?**

*Fill **one** circle only.*

Yes -- ◯ → **(If Yes, go to #14)**

No -- ◯

If No,

MSBG13B **B. If you were not born in <country>, how old were you when you came to <country>?**

*Fill **one** circle only.*

Older than 15 years old -- ◯

11 to 15 years old -- ◯

5 to 10 years old -- ◯

Younger than 5 years old -- ◯

Studying Advanced Mathematics

14

MSBM14 **How much time do you spend in mathematics class each week?**

_____ minutes per week

*Write in the number of **minutes** per week.*

Please convert the number of classes/periods into minutes.

15

MSBM15 **How much time do you spend on mathematics outside of class each week?**

_____ minutes per week

*Write in the number of **minutes** per week.*

Please convert the number of hours into minutes.

16

MSBM16A **A. During the school year, do you work at a paid job on a regular basis?**

*Fill **one** circle only.*

Yes -- ◯

No -- ◯ →

(If No, go to #17)

If Yes,

MSBM16B **B. How much time do you spend working at the paid job each week?**

_____ minutes per week

*Write in the number of **minutes** per week.*

Please convert the number of hours into minutes.

17

MSBM17A **A. During the last 12 months, have you attended extra lessons or tutoring not provided by the school in advanced mathematics?**

*Fill **one** circle only.*

Yes -- ◯

No -- ◯ → **(If No, go to #18)**

If Yes,

B. Why did you attend these extra lessons or tutoring?

*Fill **one** circle for each line.*

		Yes	No
MSBM17BA	a) To excel in class	◯	◯
MSBM17BB	b) To keep up in class	◯	◯
MSBM17BC	c) To do well on an examination	◯	◯

MSBM17C **C. For how many of the last 12 months have you attended extra lessons or tutoring in advanced mathematics?**

*Fill **one** circle only.*

Less than 4 months -- ◯

4-8 months -- ◯

More than 8 months -- ◯

18

How much do you agree with these statements about your advanced mathematics lessons?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MSBM18A	a) The teacher clearly communicates the purpose of each mathematics lesson	○	○	○	○
MSBM18B	b) I know what my teacher expects me to do	○	○	○	○
MSBM18C	c) My teacher is easy to understand	○	○	○	○
MSBM18D	d) I am interested in what my teacher says	○	○	○	○
MSBM18E	e) My teacher gives me interesting things to do	○	○	○	○
MSBM18F	f) My teacher asks me thought provoking questions	○	○	○	○
MSBM18G	g) My teacher has clear answers to my questions	○	○	○	○
MSBM18H	h) My teacher links new content to what I already know	○	○	○	○

18 (continued)

How much do you agree with these statements about your advanced mathematics lessons?

*Fill **one** circle for each line.*

			Agree a lot	Agree a little	Disagree a little	Disagree a lot
MSBM18I	i)	My teacher is good at explaining advanced mathematics	○	○	○	○
MSBM18J	j)	My teacher provides the opportunity for me to show what I have learned	○	○	○	○
MSBM18K	k)	My teacher encourages me to keep working on advanced mathematics problems until I solve them	○	○	○	○
MSBM18L	l)	My teacher provides helpful feedback on my schoolwork (including homework)	○	○	○	○
MSBM18M	m)	My teacher uses a variety of teaching methods, tasks, and activities to help us learn	○	○	○	○
MSBM18N	n)	My teacher believes that I can learn difficult advanced mathematics material	○	○	○	○
MSBM18O	o)	I like the way my teacher teaches mathematics	○	○	○	○

19

Do you use the Internet to do any of the following tasks for advanced mathematics schoolwork (including classroom tasks, homework, and studying outside of class)?

*Fill **one** circle for each line.*

		Yes	No
MSBM19A	a) Access the textbook or other course materials	○	○
MSBM19B	b) Access assignments posted online by my teacher	○	○
MSBM19C	c) Collaborate with classmates on mathematics assignments or projects	○	○
MSBM19D	d) Communicate with the teacher	○	○
MSBM19E	e) Discuss mathematics topics with other students	○	○
MSBM19F	f) Find information, articles, or tutorials to aid in understanding mathematics concepts	○	○
MSBM19G	g) Find information, articles, or tutorials to aid in solving mathematics problems	○	○

20

How much do you agree with these statements about the mathematics you are studying?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MSBM20A	a) When I do mathematics problems, I sometimes get completely absorbed	○	○	○	○
MSBM20B	b) I get a sense of satisfaction when I solve mathematics problems	○	○	○	○
MSBM20C	c) I feel bored when I do my mathematics schoolwork	○	○	○	○
MSBM20D	d) I like studying for my mathematics class outside of school	○	○	○	○
MSBM20E	e) It is interesting to learn mathematics theory	○	○	○	○
MSBM20F	f) I dread my mathematics class	○	○	○	○
MSBM20G	g) I am studying mathematics because I like to learn new things	○	○	○	○
MSBM20H	h) I enjoy figuring out challenging mathematics	○	○	○	○
MSBM20I	i) Mathematics is one of my favorite subjects	○	○	○	○
MSBM20J	j) Jobs that require advanced mathematics skills seem interesting to me	○	○	○	○
MSBM20K	k) I wish I did not have to study mathematics	○	○	○	○
MSBM20L	l) I enjoy thinking about the world in terms of mathematical relationships	○	○	○	○

21

How much do you agree with these statements about the mathematics you are studying?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MSBM21A	a) Learning mathematics will help me get ahead in the world	○	○	○	○
MSBM21B	b) It is important to do well in my mathematics class	○	○	○	○
MSBM21C	c) The mathematics I am studying is not useful for my future	○	○	○	○
MSBM21D	d) My parents are pleased that I am taking advanced mathematics	○	○	○	○
MSBM21E	e) Doing well in mathematics will help me get into the <university> of my choice	○	○	○	○
MSBM21F	f) Learning advanced mathematics does not seem to be a worthwhile exercise	○	○	○	○
MSBM21G	g) My parents think that it is important that I do well in my mathematics class	○	○	○	○
MSBM21H	h) I like telling people I am studying advanced mathematics	○	○	○	○
MSBM21I	i) Learning advanced mathematics will give me more job opportunities	○	○	○	○

Your School

22

What do you think about your school? Tell how much you agree with these statements.

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MSBM22A	a) I enjoy school	○	○	○	○
MSBM22B	b) I feel safe when I am at school	○	○	○	○
MSBM22C	c) I feel like I belong at this school	○	○	○	○
MSBM22D	d) I like to see my classmates at school	○	○	○	○
MSBM22E	e) Teachers at my school are fair to me	○	○	○	○
MSBM22F	f) I am proud to go to this school	○	○	○	○
MSBM22G	g) I learn a lot in school	○	○	○	○
MSBM22H	h) My classmates respect students who excel in school subjects	○	○	○	○
MSBM22I	i) My classmates respect students who struggle learning school subjects	○	○	○	○

23

During this school year, how often have other students from your school done any of the following things to you (including through texting or the Internet)?

*Fill **one** circle for each line.*

		At least once a week	Once or twice a month	A few times a year	Never
MSBM23A	a) Made fun of me or called me names	○	○	○	○
MSBM23B	b) Excluded me from their activities	○	○	○	○
MSBM23C	c) Spread lies about me	○	○	○	○
MSBM23D	d) Stole something from me	○	○	○	○
MSBM23E	e) Hit or hurt me (*e.g., shoving, hitting, kicking*)	○	○	○	○
MSBM23F	f) Made me do things I didn't want to do	○	○	○	○
MSBM23G	g) Posted embarrassing things about me online	○	○	○	○
MSBM23H	h) Threatened me	○	○	○	○

Thank You!

Thank you for filling out the questionnaire!

BOSTON COLLEGE

TIMSS Advanced 2015

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Student Questionnaire Advanced Mathematics

International Association for the Evaluation of Educational Achievement

timss.bc.edu

TIMSS Advanced 2015

SECTION 2: PHYSICS STUDENT QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.2: Index of International Background Variables for the TIMSS Advanced 2015 Physics Student Questionnaire

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQG-01	PSBG01	Are you female or male?	PS2GSEX	Modified wording in 2015
SQG-02a	PSBG02A	When were you born? Month	PS2GBRTM	
SQG-02b	PSBG02B	When were you born? Year	PS2GBRTY	
SQG-03	PSBG03	How often do you speak <language of test> at home?	PS2GOLAN	
SQG-04	PSBG04	About how many books are there in your home? (Do not count magazines, newspapers, or your school books.)	PS2GBOOK	
SQG-05	PSBG05	How many digital information devices are there in your home? Count computers, tablets, smartphones, smart TVs, and e-readers.		
SQG-06a	PSBG06A	Do you have any of these things? Your own computer	PS2GTH03	Modified wording in 2015
SQG-06b	PSBG06B	Do you have any of these things? Your own tablet		
SQG-06c	PSBG06C	Do you have any of these things? Your own smartphone		
SQG-06d	PSBG06D	Do you have any of these things? Your own graphing calculator	PS2GTH04	Modified wording in 2015
SQG-06e	PSBG06E	Do you have any of these things? A gaming system		
SQG-06f	PSBG06F	Do you have any of these things? Study desk/table for your use	PS2GTH05	Modified wording in 2015
SQG-06g	PSBG06G	Do you have any of these things? Your own room		
SQG-06h	PSBG06H	Do you have any of these things? <country-specific indicator of wealth>		
SQG-06i	PSBG06I	Do you have any of these things? <country-specific indicator of wealth>		
SQG-06j	PSBG06J	Do you have any of these things? <country-specific indicator of wealth>		
SQG-07A	PSBG07A	What is the highest level of education completed by your mother (or stepmother or female guardian)?	PS2GHLEM	Modified response options in 2015
SQG-07B	PSBG07B	What is the highest level of education completed by your father (or stepfather or male guardian)?	PS2GHLEF	Modified response options in 2015
SQG-08a	PSBG08A	What kind of work do your father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs? Your father		
SQG-08b	PSBG08B	What kind of work do your father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs? Your mother		
SQG-09	PSBG09	How far in your education do you expect to go?		
SQG-10a	PSBG10A	If you plan to continue your education, which area(s) do you intend to study? Mathematics or Statistics		
SQG-10b	PSBG10B	If you plan to continue your education, which area(s) do you intend to study? Physics		
SQG-10c	PSBG10C	If you plan to continue your education, which area(s) do you intend to study? Chemistry		
SQG-10d	PSBG10D	If you plan to continue your education, which area(s) do you intend to study? Biological and Biomedical Sciences (e.g., dentistry, medicine, nursing, pharmacology, veterinary medicine)		
SQG-10e	PSBG10E	If you plan to continue your education, which area(s) do you intend to study? Engineering and Engineering Technologies (e.g., aerospace engineering, chemical engineering, civil engineering, electrical engineering, mechanical engineering)		
SQG-10f	PSBG10F	If you plan to continue your education, which area(s) do you intend to study? Computer and Information Sciences		
SQG-10g	PSBG10G	If you plan to continue your education, which area(s) do you intend to study? Education		
SQG-10h	PSBG10H	If you plan to continue your education, which area(s) do you intend to study? Business (e.g., accounting, marketing, administration, finance, management)		
SQG-10i	PSBG10I	If you plan to continue your education, which area(s) do you intend to study? Law		

Exhibit S1.2: Index of International Background Variables for the TIMSS Advanced 2015 Physics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQG-10j	PSBG10J	If you plan to continue your education, which area(s) do you intend to study? Social Sciences (e.g., sociology, political science, economics, psychology)		
SQG-10k	PSBG10K	If you plan to continue your education, which area(s) do you intend to study? Arts and Humanities (e.g., art, language, literature, history, philosophy)		
SQG-10l	PSBG10L	If you plan to continue your education, which area(s) do you intend to study? Other Science Fields of Study		
SQG-10m	PSBG10M	If you plan to continue your education, which area(s) do you intend to study? Other Non-science Fields of Study		
SQG-11a	PSBG11A	In the future, do you want to work in any of the following professional fields? Education (e.g., teacher, university professor)		
SQG-11b	PSBG11B	In the future, do you want to work in any of the following professional fields? Engineering and Engineering Technologies (e.g., aerospace engineer, chemical engineer, civil engineer, electrical engineer, mechanical engineer)		
SQG-11c	PSBG11C	In the future, do you want to work in any of the following professional fields? Computer and Information Sciences (e.g., database administrator, network administrator, software or application developer, systems analyst)		
SQG-11d	PSBG11D	In the future, do you want to work in any of the following professional fields? Finance/Banking		
SQG-11e	PSBG11E	In the future, do you want to work in any of the following professional fields? Biological and Biomedical Sciences (e.g., biomedical engineer, biochemist, biophysicist, dentist, medical doctor, nurse, veterinarian)		
SQG-11f	PSBG11F	In the future, do you want to work in any of the following professional fields? Environmental Sciences		
SQG-11g	PSBG11G	In the future, do you want to work in any of the following professional fields? Agriculture and Agricultural Sciences		
SQG-11h	PSBG11H	In the future, do you want to work in any of the following professional fields? Actuarial Sciences		
SQG-11i	PSBG11I	In the future, do you want to work in any of the following professional fields? Other Fields		
SQG-12A	PSBG12A	Was your mother (or stepmother or female guardian) born in <country>?	PS2GMBRN	Modified response options in 2015
SQG-12B	PSBG12B	Was your father (or stepfather or male guardian) born in <country>?	PS2GFBRN	Modified response options in 2015
SQG-13A	PSBG13A	Were you born in <country>?	PS2GBORN	
SQG-13B	PSBG13B	If you were not born in <country>, how old were you when you came to <country>?	PS2GBRNC	Modified response options in 2015
SQP-14	PSBP14	How much time do you spend in physics class each week? (minutes per week)	PS2PHMMW	
SQP-15	PSBP15	How much time do you spend on physics outside of class each week? (minutes per week)		
SQP-16A	PSBP16A	During the school year, do you work at a paid job on a regular basis?		
SQP-16B	PSBP16B	(If Yes) How much time do you spend working at the paid job each week? (minutes per week)		
SQP-17A	PSBP17A	During the last 12 months, have you attended extra lessons or tutoring not provided by the school in physics?		
SQP-17Ba	PSBP17BA	(If Yes) Why did you attend these extra lessons or tutoring? To excel in class		
SQP-17Bb	PSBP17BB	(If Yes) Why did you attend these extra lessons or tutoring? To keep up in class		
SQP-17Bc	PSBP17BC	(If Yes) Why did you attend these extra lessons or tutoring? To do well on an examination		
SQP-17C	PSBP17C	(If Yes) For how many of the last 12 months have you attended extra lessons or tutoring in physics?		

Exhibit S1.2: Index of International Background Variables for the TIMSS Advanced 2015 Physics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQP-18a	PSBP18A	How much do you agree with these statements about your physics lessons? The teacher clearly communicates the purpose of each physics lesson		
SQP-18b	PSBP18B	How much do you agree with these statements about your physics lessons? I know what my teacher expects me to do		
SQP-18c	PSBP18C	How much do you agree with these statements about your physics lessons? My teacher is easy to understand		
SQP-18d	PSBP18D	How much do you agree with these statements about your physics lessons? I am interested in what my teacher says		
SQP-18e	PSBP18E	How much do you agree with these statements about your physics lessons? My teacher gives me interesting things to do		
SQP-18f	PSBP18F	How much do you agree with these statements about your physics lessons? My teacher asks me thought provoking questions		
SQP-18g	PSBP18G	How much do you agree with these statements about your physics lessons? My teacher has clear answers to my questions		
SQP-18h	PSBP18H	How much do you agree with these statements about your physics lessons? My teacher links new content to what I already know		
SQP-18i	PSBP18I	How much do you agree with these statements about your physics lessons? My teacher is good at explaining physics		
SQP-18j	PSBP18J	How much do you agree with these statements about your physics lessons? My teacher provides the opportunity for me to show what I have learned		
SQP-18k	PSBP18K	How much do you agree with these statements about your physics lessons? My teacher encourages me to keep working on physics problems until I solve them		
SQP-18l	PSBP18L	How much do you agree with these statements about your physics lessons? My teacher provides helpful feedback on my schoolwork (including homework)		
SQP-18m	PSBP18M	How much do you agree with these statements about your physics lessons? My teacher uses a variety of teaching methods, tasks, and activities to help us learn		
SQP-18n	PSBP18N	How much do you agree with these statements about your physics lessons? My teacher believes that I can learn difficult physics material		
SQP-18o	PSBP18O	How much do you agree with these statements about your physics lessons? I like the way my teacher teaches physics		
SQP-19a	PSBP19A	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Access the textbook or other course materials		
SQP-19b	PSBP19B	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Access assignments posted online by my teacher		
SQP-19c	PSBP19C	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Collaborate with classmates on physics assignments or projects		
SQP-19d	PSBP19D	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Communicate with the teacher		
SQP-19e	PSBP19E	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Discuss physics topics with other students		
SQP-19f	PSBP19F	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Find information, articles, or tutorials to aid in understanding physics concepts		
SQP-19g	PSBP19G	Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)? Find information, articles, or tutorials to aid in solving physics problems		

Exhibit S1.2: Index of International Background Variables for the TIMSS Advanced 2015 Physics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQP-20a	PSBP20A	How much do you agree with these statements about the physics you are studying? I enjoy conducting experiments or investigations in physics		
SQP-20b	PSBP20B	How much do you agree with these statements about the physics you are studying? I get a sense of satisfaction when I solve physics problems		
SQP-20c	PSBP20C	How much do you agree with these statements about the physics you are studying? I feel bored when I do my physics schoolwork		
SQP-20d	PSBP20D	How much do you agree with these statements about the physics you are studying? I like studying for my physics class outside of school		
SQP-20e	PSBP20E	How much do you agree with these statements about the physics you are studying? It is interesting to learn physics laws and principles		
SQP-20f	PSBP20F	How much do you agree with these statements about the physics you are studying? I dread my physics class		
SQP-20g	PSBP20G	How much do you agree with these statements about the physics you are studying? I am studying physics because I like to learn new things		
SQP-20h	PSBP20H	How much do you agree with these statements about the physics you are studying? I enjoy figuring out challenging physics		
SQP-20i	PSBP20I	How much do you agree with these statements about the physics you are studying? Physics is one of my favorite subjects		
SQP-20j	PSBP20J	How much do you agree with these statements about the physics you are studying? Jobs that require physics skills seem interesting to me		
SQP-20k	PSBP20K	How much do you agree with these statements about the physics you are studying? I wish I did not have to study physics		
SQP-20l	PSBP20L	How much do you agree with these statements about the physics you are studying? I enjoy thinking about the world in terms of laws of physics		
SQP-21a	PSBP21A	How much do you agree with these statements about the physics you are studying? Learning physics will help me get ahead in the world		
SQP-21b	PSBP21B	How much do you agree with these statements about the physics you are studying? It is important to do well in my physics class		
SQP-21c	PSBP21C	How much do you agree with these statements about the physics you are studying? The physics I am studying is not useful for my future		
SQP-21d	PSBP21D	How much do you agree with these statements about the physics you are studying? My parents are pleased that I am taking physics		
SQP-21e	PSBP21E	How much do you agree with these statements about the physics you are studying? Doing well in physics will help me get into the <university> of my choice		
SQP-21f	PSBP21F	How much do you agree with these statements about the physics you are studying? Learning physics does not seem to be a worthwhile exercise		
SQP-21g	PSBP21G	How much do you agree with these statements about the physics you are studying? My parents think that it is important that I do well in my physics class		
SQP-21h	PSBP21H	How much do you agree with these statements about the physics you are studying? I like telling people I am studying physics		
SQP-21i	PSBP21I	How much do you agree with these statements about the physics you are studying? Learning physics will give me more job opportunities		
SQP-22a	PSBP22A	What do you think about your school? Tell how much you agree with these statements. I enjoy school		
SQP-22b	PSBP22B	What do you think about your school? Tell how much you agree with these statements. I feel safe when I am at school		
SQP-22c	PSBP22C	What do you think about your school? Tell how much you agree with these statements. I feel like I belong at this school		
SQP-22d	PSBP22D	What do you think about your school? Tell how much you agree with these statements. I like to see my classmates at school		

Exhibit S1.2: Index of International Background Variables for the TIMSS Advanced 2015 Physics Student Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
SQP-22e	PSBP22E	What do you think about your school? Tell how much you agree with these statements. Teachers at my school are fair to me		
SQP-22f	PSBP22F	What do you think about your school? Tell how much you agree with these statements. I am proud to go to this school		
SQP-22g	PSBP22G	What do you think about your school? Tell how much you agree with these statements. I learn a lot in school		
SQP-22h	PSBP22H	What do you think about your school? Tell how much you agree with these statements. My classmates respect students who excel in school subjects		
SQP-22i	PSBP22I	What do you think about your school? Tell how much you agree with these statements. My classmates respect students who struggle learning school subjects		
SQP-23a	PSBP23A	During this school year, how often have other students from your school done any of the following things to you? Made fun of me or called me names		
SQP-23b	PSBP23B	During this school year, how often have other students from your school done any of the following things to you? Excluded me from their activities		
SQP-23c	PSBP23C	During this school year, how often have other students from your school done any of the following things to you? Spread lies about me		
SQP-23d	PSBP23D	During this school year, how often have other students from your school done any of the following things to you? Stole something from me		
SQP-23e	PSBP23E	During this school year, how often have other students from your school done any of the following things to you? Hit or hurt me		
SQP-23f	PSBP23F	During this school year, how often have other students from your school done any of the following things to you? Made me do things I didn't want to do		
SQP-23g	PSBP23G	During this school year, how often have other students from your school done any of the following things to you? Posted embarrassing things about me online		
SQP-23h	PSBP23H	During this school year, how often have other students from your school done any of the following things to you? Threatened me		

TIMSS Advanced 2015

Identification Label

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Student Questionnaire Physics

<TIMSS National Research Center Name>
<Address>

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Directions

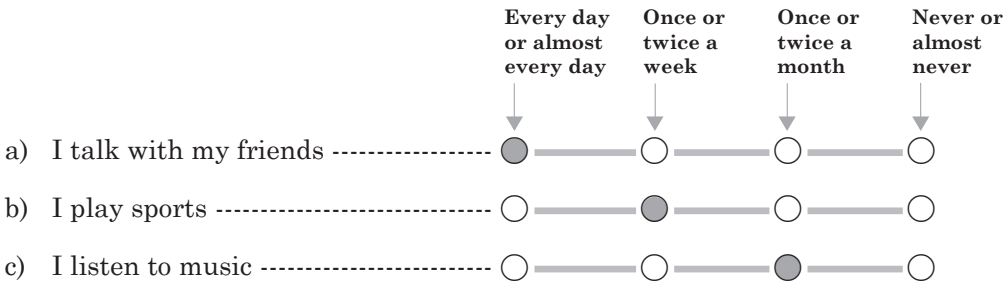
In this booklet, you will find questions about yourself. Some questions ask for facts while other questions ask for your opinion.

Each question is followed by a number of answers. Shade in the circle next to or under the answer of your choice as shown in the example below.

Example

How often do you do these things?

*Fill **one** circle for each line.*



- 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, draw an X through your first answer, like this: ⊗. Then, fill in the circle next to or under your new answer.
- Ask for help if you do not understand something or are not sure how to answer.

About you

1

PSBG01

Are you female or male?

*Fill **one** circle only.*

Female -- ◯

Male -- ◯

2

When were you born?

Fill the circles next to the month and year you were born.

PSBG02A
PSBG02B

a) Month		b) Year	
January --	◯	1993 --	◯
February --	◯	1994 --	◯
March --	◯	1995 --	◯
April --	◯	1996 --	◯
May --	◯	1997 --	◯
June --	◯	1998 --	◯
July --	◯	1999 --	◯
August --	◯	2000 --	◯
September --	◯	2001 --	◯
October --	◯	Other --	◯
November --	◯		
December --	◯		

3

PSBG03

How often do you speak <language of test> at home?

*Fill **one** circle only.*

Always --◯

Almost always --◯

Sometimes --◯

Never --◯

4

PSBG04

About how many books are there in your home? (Do not count magazines, newspapers, or your school books.)

*Fill **one** circle only.*

None or very few (0–10 books) --◯

Enough to fill one shelf (11–25 books) --◯

Enough to fill one bookcase (26–100 books) --◯

Enough to fill two bookcases (101–200 books) --◯

Enough to fill three or more bookcases (more than 200) --◯

5

PSBG05 **How many digital information devices are there in your home? Count computers, tablets, smartphones, smart TVs, and e-readers. (Do not count other devices.)**

*Fill **one** circle only.*

- None -- ◯
- 1-3 devices -- ◯
- 4-6 devices -- ◯
- 7-10 devices -- ◯
- More than 10 devices -- ◯

6

Do you have any of these things?

*Fill **one** circle for each line.*

		Yes	No
PSBG06A	a) Your own computer	◯	◯
PSBG06B	b) Your own tablet	◯	◯
PSBG06C	c) Your own smartphone	◯	◯
PSBG06D	d) Your own graphing calculator	◯	◯
PSBG06E	e) A gaming system (e.g., PlayStation®, Wii®, XBox®)	◯	◯
PSBG06F	f) Study desk/table for your use	◯	◯
PSBG06G	g) Your own room	◯	◯
PSBG06H	h) <country-specific indicator of wealth>	◯	◯
PSBG06I	i) <country-specific indicator of wealth>	◯	◯
PSBG06J	j) <country-specific indicator of wealth>	◯	◯

7

PSBG07A **A. What is the highest level of education completed by your mother (or stepmother or female guardian)?**

*Fill **one** circle only.*

- Some <Primary education—ISCED Level 1 or Lower secondary education—ISCED Level 2> or did not go to school ◯
- <Lower secondary education—ISCED Level 2> ◯
- <Upper secondary education—ISCED Level 3> ◯
- <Post-secondary, non-tertiary education—ISCED Level 4> ◯
- <Short-cycle tertiary education—ISCED Level 5> ◯
- <Bachelor's or equivalent level—ISCED Level 6> ◯
- <Master's or equivalent level—ISCED Level 7> ◯
- <Doctor or equivalent level—ISCED Level 8> ◯
- I don't know ◯

PSBG07B **B. What is the highest level of education completed by your father (or stepfather or male guardian)?**

*Fill **one** circle only.*

- Some <Primary education—ISCED Level 1 or Lower secondary education—ISCED Level 2> or did not go to school ◯
- <Lower secondary education—ISCED Level 2> ◯
- <Upper secondary education—ISCED Level 3> ◯
- <Post-secondary, non-tertiary education—ISCED Level 4> ◯
- <Short-cycle tertiary education—ISCED Level 5> ◯
- <Bachelor's or equivalent level—ISCED Level 6> ◯
- <Master's or equivalent level—ISCED Level 7> ◯
- <Doctor or equivalent level—ISCED Level 8> ◯
- I don't know ◯

8

What kind of work do your father (or stepfather or male guardian) and mother (or stepmother or female guardian) do for their main jobs?

For each, fill the circle for the job category that best describes what he/she does. Each category has a few examples to help you decide the correct category. If your father or mother is not working now, think about the last job he/she had.

*Fill **one** circle in each column.*

PSBG08A
PSBG08B

	Your father	Your mother
a) Has never worked for pay	○	○
b) Small Business Owner Includes owners of small businesses (fewer than 25 employees) such as retail shops, services, restaurants	○	○
c) Clerk Includes office clerks; secretaries; typists; data entry operators; customer service clerks	○	○
d) Service or Sales Worker Includes travel attendants; restaurant service workers; personal care workers; protective service workers; junior military and police; salespersons; street vendors	○	○
e) Skilled Agricultural or Fishery Worker Includes farmers; forestry workers; fishery workers; hunters and trappers	○	○
f) Craft or Trade Worker Includes builders, carpenters, plumbers, electricians, metal workers; machine mechanics; handicraft workers	○	○

Continued on next page →

8 (continued)

	Your father	Your mother
g) Plant or Machine Operator Includes plant and machine operators; assembly-line operators; motor-vehicle drivers	○	○
h) General Laborers Includes domestic helpers and cleaners; building caretakers; messengers, porters, and doorkeepers; farm, fishery, agricultural, and construction workers	○	○
i) Corporate Manager or Senior Official Includes corporate managers such as managers of large companies (25 or more employees) or managers of departments within large companies; legislators or senior government officials; senior officials of special-interest organizations; military officers	○	○
j) Professional Includes scientists; mathematicians; computer scientists; architects; engineers; life science and health professionals; teachers; legal professionals; social scientists; writers and artists; religious professionals	○	○
k) Technician or Associate Professional Includes science, engineering, and computer associates and technicians; life science and health technicians and assistants; teacher aides; finance and sales associate professionals; business service agents; administrative assistants	○	○
l) I don't know	○	○

9

PSBG09 **How far in your education do you expect to go?**

*Fill **one** circle only.*

<Upper secondary education—ISCED Level 3> -- ◯

<Post-secondary, non-tertiary education—ISCED Level 4> -- ◯

<Short-cycle tertiary education—ISCED Level 5> -- ◯

<Bachelor's or equivalent level—ISCED Level 6> -- ◯

<Master's or equivalent level—ISCED Level 7> -- ◯

<Doctor or equivalent level—ISCED Level 8> -- ◯

10

If you plan to continue your education, which area(s) do you intend to study?

Fill the circle(s) that apply.

PSBG10A	Mathematics or Statistics ◯
PSBG10B	Physics ◯
PSBG10C	Chemistry ◯
PSBG10D	Biological and Biomedical Sciences (e.g., dentistry, medicine, nursing, pharmacology, veterinary medicine) ◯
PSBG10E	Engineering and Engineering Technologies (e.g., aerospace engineering, chemical engineering, civil engineering, electrical engineering, mechanical engineering) ◯
PSBG10F	Computer and Information Sciences ◯
PSBG10G	Education ◯
PSBG10H	Business (e.g., accounting, marketing, administration, finance, management) ◯
PSBG10I	Law ◯
PSBG10J	Social Sciences (e.g., sociology, political science, economics, psychology) ◯
PSBG10K	Arts and Humanities (e.g., art, language, literature, history, philosophy) ◯
PSBG10L	Other Science Fields of Study ◯
PSBG10M	Other Non-science Fields of Study ◯

11

In the future, do you want to work in any of the following professional fields?

*Fill **one** circle for each line.*

		Yes	Maybe	No
PSBG11A	a) Education (e.g., teacher, university professor)	○	○	○
PSBG11B	b) Engineering and Engineering Technologies (e.g., aerospace engineer, chemical engineer, civil engineer, electrical engineer, mechanical engineer)	○	○	○
PSBG11C	c) Computer and Information Sciences (e.g., database administrator, network administrator, software or application developer, systems analyst)	○	○	○
PSBG11D	d) Finance/Banking	○	○	○
PSBG11E	e) Biological and Biomedical Sciences (e.g., biomedical engineer, biochemist, biophysicist, dentist, medical doctor, nurse, veterinarian)	○	○	○
PSBG11F	f) Environmental Sciences	○	○	○
PSBG11G	g) Agriculture and Agricultural Sciences	○	○	○
PSBG11H	h) Actuarial Sciences	○	○	○
PSBG11I	i) Other Fields	○	○	○

12

PSBG12A **A. Was your mother (or stepmother or female guardian) born in <country>?**

*Fill **one** circle only.*

Yes -- ◯

No -- ◯

I don't know -- ◯

PSBG12B **B. Was your father (or stepfather or male guardian) born in <country>?**

*Fill **one** circle only.*

Yes -- ◯

No -- ◯

I don't know -- ◯

13

PSBG13A **A. Were you born in <country>?**

*Fill **one** circle only.*

Yes -- ◯ → **(If Yes, go to #14)**

No -- ◯

If No,

PSBG13B **B. If you were not born in <country>, how old were you when you came to <country>?**

*Fill **one** circle only.*

Older than 15 years old -- ◯

11 to 15 years old -- ◯

5 to 10 years old -- ◯

Younger than 5 years old -- ◯

Studying Physics

14

PSBP14 **How much time do you spend in physics class each week?**

_____ minutes per week

*Write in the number of **minutes** per week.*

Please convert the number of classes/periods into minutes.

15

PSBP15 **How much time do you spend on physics outside of class each week?**

_____ minutes per week

*Write in the number of **minutes** per week.*

Please convert the number of hours into minutes.

16

PSBP16A **A. During the school year, do you work at a paid job on a regular basis?**

*Fill **one** circle only.*

Yes -- ◯

No -- ◯ →

(If No, go to #17)

If Yes,

PSBP16B **B. How much time do you spend working at the paid job each week?**

_____ minutes per week

*Write in the number of **minutes** per week.*

Please convert the number of hours into minutes.

17

PSBP17A **A. During the last 12 months, have you attended extra lessons or tutoring not provided by the school in physics?**

*Fill **one** circle only.*

Yes --○

No --○ → **(If No, go to #18)**

If Yes,

B. Why did you attend these extra lessons or tutoring?

*Fill **one** circle for each line.*

		Yes	No
PSBP17BA	a) To excel in class	○	○
PSBP17BB	b) To keep up in class	○	○
PSBP17BC	c) To do well on an examination	○	○

PSBP17C **C. For how many of the last 12 months have you attended extra lessons or tutoring in physics?**

*Fill **one** circle only.*

Less than 4 months --○

4-8 months --○

More than 8 months --○

18

How much do you agree with these statements about your physics lessons?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PSBP18A	a) The teacher clearly communicates the purpose of each physics lesson	○	○	○	○
PSBP18B	b) I know what my teacher expects me to do	○	○	○	○
PSBP18C	c) My teacher is easy to understand	○	○	○	○
PSBP18D	d) I am interested in what my teacher says	○	○	○	○
PSBP18E	e) My teacher gives me interesting things to do	○	○	○	○
PSBP18F	f) My teacher asks me thought provoking questions	○	○	○	○
PSBP18G	g) My teacher has clear answers to my questions	○	○	○	○
PSBP18H	h) My teacher links new content to what I already know	○	○	○	○

18 (continued)

How much do you agree with these statements about your physics lessons?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PSBP18I	i) My teacher is good at explaining physics	○	○	○	○
PSBP18J	j) My teacher provides the opportunity for me to show what I have learned	○	○	○	○
PSBP18K	k) My teacher encourages me to keep working on physics problems until I solve them	○	○	○	○
PSBP18L	l) My teacher provides helpful feedback on my schoolwork (including homework)	○	○	○	○
PSBP18M	m) My teacher uses a variety of teaching methods, tasks, and activities to help us learn	○	○	○	○
PSBP18N	n) My teacher believes that I can learn difficult physics material	○	○	○	○
PSBP18O	o) I like the way my teacher teaches physics	○	○	○	○

19

Do you use the Internet to do any of the following tasks for physics schoolwork (including classroom tasks, homework, and studying outside of class)?

*Fill **one** circle for each line.*

		Yes	No
PSBP19A	a) Access the textbook or other course materials	○	○
PSBP19B	b) Access assignments posted online by my teacher	○	○
PSBP19C	c) Collaborate with classmates on physics assignments or projects	○	○
PSBP19D	d) Communicate with the teacher	○	○
PSBP19E	e) Discuss physics topics with other students	○	○
PSBP19F	f) Find information, articles, or tutorials to aid in understanding physics concepts	○	○
PSBP19G	g) Find information, articles, or tutorials to aid in solving physics problems	○	○

20

How much do you agree with these statements about the physics you are studying?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PSBP20A	a) I enjoy conducting experiments or investigations in physics	○	○	○	○
PSBP20B	b) I get a sense of satisfaction when I solve physics problems	○	○	○	○
PSBP20C	c) I feel bored when I do my physics schoolwork	○	○	○	○
PSBP20D	d) I like studying for my physics class outside of school	○	○	○	○
PSBP20E	e) It is interesting to learn physics laws and principles	○	○	○	○
PSBP20F	f) I dread my physics class	○	○	○	○
PSBP20G	g) I am studying physics because I like to learn new things	○	○	○	○
PSBP20H	h) I enjoy figuring out challenging physics	○	○	○	○
PSBP20I	i) Physics is one of my favorite subjects	○	○	○	○
PSBP20J	j) Jobs that require physics skills seem interesting to me	○	○	○	○
PSBP20K	k) I wish I did not have to study physics	○	○	○	○
PSBP20L	l) I enjoy thinking about the world in terms of laws of physics	○	○	○	○

21

How much do you agree with these statements about the physics you are studying?

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PSBP21A	a) Learning physics will help me get ahead in the world	○	○	○	○
PSBP21B	b) It is important to do well in my physics class	○	○	○	○
PSBP21C	c) The physics I am studying is not useful for my future	○	○	○	○
PSBP21D	d) My parents are pleased that I am taking physics	○	○	○	○
PSBP21E	e) Doing well in physics will help me get into the <university> of my choice	○	○	○	○
PSBP21F	f) Learning physics does not seem to be a worthwhile exercise	○	○	○	○
PSBP21G	g) My parents think that it is important that I do well in my physics class	○	○	○	○
PSBP21H	h) I like telling people I am studying physics	○	○	○	○
PSBP21I	i) Learning physics will give me more job opportunities	○	○	○	○

Your School

22

What do you think about your school? Tell how much you agree with these statements.

*Fill **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PSBP22A	a) I enjoy school	○	○	○	○
PSBP22B	b) I feel safe when I am at school	○	○	○	○
PSBP22C	c) I feel like I belong at this school	○	○	○	○
PSBP22D	d) I like to see my classmates at school	○	○	○	○
PSBP22E	e) Teachers at my school are fair to me	○	○	○	○
PSBP22F	f) I am proud to go to this school	○	○	○	○
PSBP22G	g) I learn a lot in school	○	○	○	○
PSBP22H	h) My classmates respect students who excel in school subjects	○	○	○	○
PSBP22I	i) My classmates respect students who struggle learning school subjects	○	○	○	○

23

During this school year, how often have other students from your school done any of the following things to you (including through texting or the Internet)?

*Fill **one** circle for each line.*

		At least once a week	Once or twice a month	A few times a year	Never
PSBP23A	a) Made fun of me or called me names	○	○	○	○
PSBP23B	b) Excluded me from their activities	○	○	○	○
PSBP23C	c) Spread lies about me	○	○	○	○
PSBP23D	d) Stole something from me	○	○	○	○
PSBP23E	e) Hit or hurt me (*e.g., shoving, hitting, kicking*)	○	○	○	○
PSBP23F	f) Made me do things I didn't want to do	○	○	○	○
PSBP23G	g) Posted embarrassing things about me online	○	○	○	○
PSBP23H	h) Threatened me	○	○	○	○

Thank You!

Thank you for filling out the questionnaire!

BOSTON COLLEGE

TIMSS Advanced 2015

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Student Questionnaire Physics

International Association for the Evaluation of Educational Achievement

timss.bc.edu

TIMSS Advanced 2015

SECTION 3: ADVANCED MATHEMATICS TEACHER QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-01	MTBG01	By the end of this school year, how many years will you have been teaching altogether?	MT2GTAUT	
TQG-02	MTBG02	Are you female or male?	MT2GSEX	
TQG-03	MTBG03	How old are you?	MT2GAGE	
TQG-04	MTBG04	What is the highest level of formal education you have completed?	MT2GFEDC	Modified response options in 2015
TQG-05a	MTBG05A	During your <post-secondary> education, what was your major or main area(s) of study? Mathematics	MT2GPSMA	
TQG-05b	MTBG05B	During your <post-secondary> education, what was your major or main area(s) of study? Physics	MT2GPSPH	
TQG-05c	MTBG05C	During your <post-secondary> education, what was your major or main area(s) of study? Biology		
TQG-05d	MTBG05D	During your <post-secondary> education, what was your major or main area(s) of study? Chemistry		
TQG-05e	MTBG05E	During your <post-secondary> education, what was your major or main area(s) of study? <Earth Science>		
TQG-05f	MTBG05F	During your <post-secondary> education, what was your major or main area(s) of study? Engineering	MT2GPSEN	
TQG-05g	MTBG05G	During your <post-secondary> education, what was your major or main area(s) of study? Education– Mathematics	MT2GPSEM	
TQG-05h	MTBG05H	During your <post-secondary> education, what was your major or main area(s) of study? Education– Physics		
TQG-05i	MTBG05I	During your <post-secondary> education, what was your major or main area(s) of study? Education– Science		
TQG-05j	MTBG05J	During your <post-secondary> education, what was your major or main area(s) of study? Education– General	MT2GPSEG	
TQG-05k	MTBG05K	During your <post-secondary> education, what was your major or main area(s) of study? Other	MT2GPSOT	
TQG-06a	MTBG06A	How much do you agree with these statements about advanced mathematics and physics education within your school? The school encourages students to study advanced mathematics and physics		
TQG-06b	MTBG06B	How much do you agree with these statements about advanced mathematics and physics education within your school? The school promotes professional development for teachers of advanced mathematics and physics		
TQG-06c	MTBG06C	How much do you agree with these statements about advanced mathematics and physics education within your school? The school provides students with information about career options in advanced mathematics and physics		
TQG-06d	MTBG06D	How much do you agree with these statements about advanced mathematics and physics education within your school? Advanced mathematics and physics teachers are admired by other teachers in the school		
TQG-06e	MTBG06E	How much do you agree with these statements about advanced mathematics and physics education within your school? Teachers have high expectations for student achievement in advanced mathematics and physics		
TQG-06f	MTBG06F	How much do you agree with these statements about advanced mathematics and physics education within your school? Students at this school respect students who excel in advanced mathematics and physics		

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-06g	MTBG06G	How much do you agree with these statements about advanced mathematics and physics education within your school? Parents expect their children to study advanced mathematics and physics		
TQG-07a	MTBG07A	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school is located in a safe neighborhood	MT2GCUSN	Modified response options in 2015
TQG-07b	MTBG07B	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. I feel safe at this school	MT2GCUSA	Modified response options in 2015
TQG-07c	MTBG07C	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school's security policies and practices are sufficient	MT2GCUSP	Modified response options in 2015
TQG-07d	MTBG07D	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. The students behave in an orderly manner		
TQG-07e	MTBG07E	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. The students are respectful of the teachers		
TQG-07f	MTBG07F	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. The students respect school property		
TQG-07g	MTBG07G	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school has clear rules about student conduct		
TQG-07h	MTBG07H	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school's rules are enforced in a fair and consistent manner		
TQG-08a	MTBG08A	In your current school, how severe is each problem? The school building needs significant repair	MT2GSPBR	Modified response options in 2015
TQG-08b	MTBG08B	In your current school, how severe is each problem? Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students)		
TQG-08c	MTBG08C	In your current school, how severe is each problem? Teachers do not have adequate instructional materials and supplies		
TQG-08d	MTBG08D	In your current school, how severe is each problem? The school classrooms are not cleaned often enough		
TQG-08e	MTBG08E	In your current school, how severe is each problem? The school classrooms need maintenance work		
TQG-08f	MTBG08F	In your current school, how severe is each problem? Teachers do not have adequate technological resources		
TQG-08g	MTBG08G	In your current school, how severe is each problem? Teachers do not have adequate support for using technology		
TQG-09a	MTBG09A	How often do you have the following types of interactions with other teachers? Discuss how to teach a particular topic		
TQG-09b	MTBG09B	How often do you have the following types of interactions with other teachers? Collaborate in planning and preparing instructional materials		
TQG-09c	MTBG09C	How often do you have the following types of interactions with other teachers? Share what I have learned about my teaching experiences		
TQG-09d	MTBG09D	How often do you have the following types of interactions with other teachers? Visit another classroom to learn more about teaching		

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-09e	MTBG09E	How often do you have the following types of interactions with other teachers? Work together to try out new ideas		
TQG-09f	MTBG09F	How often do you have the following types of interactions with other teachers? Work as a group on implementing the curriculum		
TQG-09g	MTBG09G	How often do you have the following types of interactions with other teachers? Work with teachers from other grades to ensure continuity in learning		
TQG-10a	MTBG10A	How often do you feel the following way about being a teacher? I am content with my profession as a teacher		
TQG-10b	MTBG10B	How often do you feel the following way about being a teacher? I am satisfied with being a teacher at this school		
TQG-10c	MTBG10C	How often do you feel the following way about being a teacher? I find my work full of meaning and purpose		
TQG-10d	MTBG10D	How often do you feel the following way about being a teacher? I am enthusiastic about my job		
TQG-10e	MTBG10E	How often do you feel the following way about being a teacher? My work inspires me		
TQG-10f	MTBG10F	How often do you feel the following way about being a teacher? I am proud of the work I do		
TQG-10g	MTBG10G	How often do you feel the following way about being a teacher? I am going to continue teaching for as long as I can		
TQG-11a	MTBG11A	Indicate the extent to which you agree or disagree with each of the following statements. There are too many students in the classes		
TQG-11b	MTBG11B	Indicate the extent to which you agree or disagree with each of the following statements. I have too much material to cover in class		
TQG-11c	MTBG11C	Indicate the extent to which you agree or disagree with each of the following statements. I have too many teaching hours		
TQG-11d	MTBG11D	Indicate the extent to which you agree or disagree with each of the following statements. I need more time to prepare for class		
TQG-11e	MTBG11E	Indicate the extent to which you agree or disagree with each of the following statements. I need more time to assist individual students		
TQG-11f	MTBG11F	Indicate the extent to which you agree or disagree with each of the following statements. I feel too much pressure from parents		
TQG-11g	MTBG11G	Indicate the extent to which you agree or disagree with each of the following statements. I have difficulty keeping up with all of the changes to the curriculum		
TQG-11h	MTBG11H	Indicate the extent to which you agree or disagree with each of the following statements. I have too many administrative tasks		
TQG-12	MTBG12	How many students are in this class?	MT2MSTUD	Modified wording in 2015
TQG-13	MTBG13	How many students in this class experience difficulties understanding spoken <language of test>?		
TQG-14a	MTBG14A	How often do you do the following in teaching this class? Relate the lesson to students' daily lives		
TQG-14b	MTBG14B	How often do you do the following in teaching this class? Ask students to explain their answers		
TQG-14c	MTBG14C	How often do you do the following in teaching this class? Ask students to complete challenging exercises that require them to go beyond the instruction		
TQG-14d	MTBG14D	How often do you do the following in teaching this class? Encourage classroom discussions among students		
TQG-14e	MTBG14E	How often do you do the following in teaching this class? Link new content to students' prior knowledge		

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-14f	MTBG14F	How often do you do the following in teaching this class? Ask students to decide their own problem solving procedures	MT2MHODE	Modified wording in 2015
TQG-14g	MTBG14G	How often do you do the following in teaching this class? Encourage students to express their ideas in class		
TQG-15a	MTBG15A	In your view, to what extent do the following limit how you teach this class? Students lacking prerequisite mathematics knowledge or skills		
TQG-15b	MTBG15B	In your view, to what extent do the following limit how you teach this class? Students suffering from lack of basic nutrition		
TQG-15c	MTBG15C	In your view, to what extent do the following limit how you teach this class. Students suffering from not enough sleep		
TQG-15d	MTBG15D	In your view, to what extent do the following limit how you teach this class? Students with physical disabilities		
TQG-15e	MTBG15E	In your view, to what extent do the following limit how you teach this class? Students with mental, emotional, or psychological disabilities		
TQM-16	MTBM16	In a typical week, how much time do you spend teaching advanced mathematics to the students in this class? (minutes per week)	MT2MTIMT	Modified wording in 2015
TQM-17	MTBM17	How many minutes per week do you usually spend preparing to teach this class?	MT2MTIPM	Modified wording in 2015
TQM-18a	MTBM18A	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Inspiring students to learn advanced mathematics		
TQM-18b	MTBM18B	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Showing students a variety of problem solving strategies		
TQM-18c	MTBM18C	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following. Providing challenging tasks for the highest achieving students		
TQM-18d	MTBM18D	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Adapting my teaching to engage students' interest		
TQM-18e	MTBM18E	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Helping students appreciate the value of learning advanced mathematics		
TQM-18f	MTBM18F	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Assessing student comprehension of advanced mathematics		
TQM-18g	MTBM18G	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Improving the understanding of struggling students		
TQM-18h	MTBM18H	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Making advanced mathematics relevant to students		
TQM-18i	MTBM18I	In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following? Developing students' higher-order thinking skills		
TQM-19a	MTBM19A	In teaching advanced mathematics to this class, how often do you ask students to do the following? Listen to me explain new mathematics content		
TQM-19b	MTBM19B	In teaching advanced mathematics to this class, how often do you ask students to do the following? Listen to me explain how to solve problems		

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQM-19c	MTBM19C	In teaching advanced mathematics to this class, how often do you ask students to do the following? Memorize rules, formulas, procedures, and facts	MT2MHOMF	Modified wording in 2015
TQM-19d	MTBM19D	In teaching advanced mathematics to this class, how often do you ask students to do the following? Work problems (individually or with peers) with my guidance		
TQM-19e	MTBM19E	In teaching advanced mathematics to this class, how often do you ask students to do the following? Work problems together in the whole class with direct guidance from me		
TQM-19f	MTBM19F	In teaching advanced mathematics to this class, how often do you ask students to do the following? Work problems (individually or with peers) while I am occupied by other tasks		
TQM-19g	MTBM19G	In teaching advanced mathematics to this class, how often do you ask students to do the following? Solve problems like the examples in their textbooks	MT2MHOSP	Modified wording in 2015
TQM-19h	MTBM19H	In teaching advanced mathematics to this class, how often do you ask students to do the following? Discuss problem solving strategies	MT2MHODP	Modified wording in 2015
TQM-19i	MTBM19I	In teaching advanced mathematics to this class, how often do you ask students to do the following? Work on problems for which there is no immediately obvious method of solution		
TQM-19j	MTBM19J	In teaching advanced mathematics to this class, how often do you ask students to do the following? Communicate their arguments	MT2MHOCA	Modified wording in 2015
TQM-19k	MTBM19K	In teaching advanced mathematics to this class, how often do you ask students to do the following? Take a written test or quiz		
TQM-20A	MTBM20A	Do the students in this class have computers, tablets, calculators, or smartphones available to use during their advanced mathematics lessons?		
TQM-20Ba	MTBM20BA	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Read the textbook or course materials in digital format		
TQM-20Bb	MTBM20BB	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Look up ideas and information		
TQM-20Bc	MTBM20BC	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Process and analyze data		
TQM-20Bd	MTBM20BD	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Draw graphs of functions		
TQM-20Be	MTBM20BE	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Solve equations		
TQM-20Bf	MTBM20BF	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Manipulate algebraic expressions		
TQM-20Bg	MTBM20BG	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Conduct modeling and simulations		
TQM-20Bh	MTBM20BH	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons? Perform numerical integration		
TQM-21Aa	MTBM21AA	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Operations with exponential, logarithmic, polynomial, rational, and radical expressions	See Question TQM3-24 in 2008 for subtopics.	

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQM-21Ab	MTBM21AB	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Operations with complex numbers	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ac	MTBM21AC	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Evaluating algebraic expressions (e.g., exponential, logarithmic, polynomial, rational, and radical)	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ad	MTBM21AD	When students in this class have been taught each of the following advanced mathematics topics. Algebra: The nth term of arithmetic and geometric sequences and the sums of finite and infinite series	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ae	MTBM21AE	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Linear, simultaneous, and quadratic equations and inequalities; radical equations, logarithmic, and exponential equations	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Af	MTBM21AF	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Slopes, y-axis intercepts, and points of intersection of straight lines	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ag	MTBM21AG	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Equivalent representations of functions, including composite functions, as ordered pairs, tables, graphs, formulas, or words	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ah	MTBM21AH	When students in this class have been taught each of the following advanced mathematics topics. Algebra: Properties of functions including domain and range	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ba	MTBM21BA	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Limits of functions	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Bb	MTBM21BB	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Conditions for continuity and differentiability of functions	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Bc	MTBM21BC	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Differentiation of functions (including polynomial, exponential, logarithmic, trigonometric, rational, and radical functions); differentiation of products, quotients, and composite functions	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Bd	MTBM21BD	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Using derivatives to solve problems (e.g., in optimization and rates of change)	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Be	MTBM21BE	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Using first and second derivatives to determine slope and local extrema of functions	See Question TQM3-24 in 2008 for subtopics.	

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQM-21Bf	MTBM21BF	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Using derivatives to determine points of inflection of functions	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Bg	MTBM21BG	When students in this class have been taught each of the following advanced mathematics topics. Calculus: Integrating functions (including polynomial, exponential, trigonometric, and rational functions); evaluating definite integrals, including calculation of areas	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Ca	MTBM21CA	When students in this class have been taught each of the following advanced mathematics topics. Geometry: Properties of geometric figures in two and three dimensions	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Cb	MTBM21CB	When students in this class have been taught each of the following advanced mathematics topics. Geometry: Properties of vectors and their sums and differences	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Cc	MTBM21CC	When students in this class have been taught each of the following advanced mathematics topics. Geometry: Trigonometric properties of triangles (sine, cosine, and tangent)	See Question TQM3-24 in 2008 for subtopics.	
TQM-21Cd	MTBM21CD	When students in this class have been taught each of the following advanced mathematics topics. Geometry: Trigonometric functions and their graphs	See Question TQM3-24 in 2008 for subtopics.	
TQM-22A	MTBM22A	Do you assign mathematics homework to this class?	MT2MHMWM	Modified wording in 2015
TQM-22Ba	MTBM22BA	How often do you assign the following kinds of mathematics homework to this class? Doing problem/question sets	MT2MKMHP	Modified wording in 2015
TQM-22Bb	MTBM22BB	How often do you assign the following kinds of mathematics homework to this class? Reading the textbook	MT2MKMHR	Modified wording in 2015
TQM-22Bc	MTBM22BC	How often do you assign the following kinds of mathematics homework to this class? Memorizing formulas and procedures	MT2MKMHM	Modified wording in 2015
TQM-22Bd	MTBM22BD	How often do you assign the following kinds of mathematics homework to this class? Gathering, analyzing, and reporting data	MT2MKMHG	Modified wording in 2015
TQM-22Be	MTBM22BE	How often do you assign the following kinds of mathematics homework to this class? Finding one or more applications of the content covered	MT2MKMHF	Modified wording in 2015
TQM-22Bf	MTBM22BF	How often do you assign the following kinds of mathematics homework to this class? Working on projects		
TQM-22Ca	MTBM22CA	How often do you do the following with the mathematics homework assignments for this class? Correct assignments and give feedback to students		
TQM-22Cb	MTBM22CB	How often do you do the following with the mathematics homework assignments for this class? Have students correct their own homework		
TQM-22Cc	MTBM22CC	How often do you do the following with the mathematics homework assignments for this class? Discuss the homework in class		
TQM-22Cd	MTBM22CD	How often do you do the following with the mathematics homework assignments for this class? Monitor whether or not the homework was completed		
TQM-22Ce	MTBM22CE	How often do you do the following with the mathematics homework assignments for this class? Use the homework to contribute towards students' grades or marks		
TQM-23a	MTBM23A	In the past two years, have you participated in professional development in any of the following? Mathematics content	MT2MPDMT	

Exhibit S1.3: Index of International Background Variables for the TIMSS Advanced 2015 Advanced Mathematics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQM-23b	MTBM23B	In the past two years, have you participated in professional development in any of the following? Mathematics pedagogy/instruction	MT2MPDMP	
TQM-23c	MTBM23C	In the past two years, have you participated in professional development in any of the following? Mathematics curriculum	MT2MPDMC	
TQM-23d	MTBM23D	In the past two years, have you participated in professional development in any of the following? Integrating information technology into mathematics	MT2MPDIT	
TQM-23e	MTBM23E	In the past two years, have you participated in professional development in any of the following? Improving students' critical thinking or problem solving skills	MT2MPDCT	Modified wording in 2015
TQM-23f	MTBM23F	In the past two years, have you participated in professional development in any of the following? Mathematics assessment	MT2MPDMA	
TQM-23g	MTBM23G	In the past two years, have you participated in professional development in any of the following? Addressing individual students' needs		
TQM-24	MTBM24	In the past two years, how many hours in total have you spent in formal <in-service/professional development> (e.g., workshops, seminars, etc.) for mathematics?		
TQM-25	MTBM25	By the end of this school year, how many years will you have taught mathematics at the advanced level?	MT2MTMAT	Modified wording in 2015
TQM-26A	MTBM26A	Are you a member of <professional organization for mathematics teachers>?	MT2MMPOM	
TQM-26B	MTBM26B	In the past two years, have you regularly participated in activities sponsored by <professional organization for mathematics teachers>?	MT2MRPPO	Modified wording in 2015
TQM-27a	MTBM27A	In the past two years, have you taken part in any of the following activities in mathematics? I attended a workshop or conference	MT2MACWO	
TQM-27b	MTBM27B	In the past two years, have you taken part in any of the following activities in mathematics? I gave a presentation at a workshop or conference	MT2MACPR	
TQM-27c	MTBM27C	In the past two years, have you taken part in any of the following activities in mathematics? I took part in an innovative project for curriculum and instruction	MT2MACIP	

TIMSS Advanced 2015

Identification Label

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Teacher Questionnaire Advanced Mathematics

<TIMSS National Research Center Name>
<Address>

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Teacher *Questionnaire—Advanced Mathematics*

Your school has agreed to participate in TIMSS Advanced 2015 (Trends in International Mathematics and Science Study), an educational research project sponsored by the International Association for the Evaluation of Educational Achievement (IEA). TIMSS Advanced measures trends in student achievement in advanced mathematics and physics and studies differences in national education systems in order to help improve teaching and learning worldwide.

This questionnaire is addressed to teachers of <twelfth grade> students, and seeks information about teachers' academic and professional backgrounds, classroom resources, instructional practices, and attitudes toward teaching. Since your class has been selected as part of a nationwide sample, your responses are very important in helping to describe the school system in <country>.

Some of the questions in the questionnaire refer to the "**TIMSS class**" or "**this class**". This is the class that is identified on the front of this booklet, and which will be tested as part of TIMSS Advanced in your school. It is important that you answer each question carefully so that the information that you provide reflects your situation as accurately as possible.

Since TIMSS Advanced is an international study and all countries are using the same questionnaire, you may find that some of the questions seem unusual or are not entirely relevant to you or schools in <country>. Nevertheless, it is important that you do your best to answer all of the questions so comparisons can be made across countries in the studies.

It is estimated that you will need approximately 35 minutes to complete this questionnaire. We appreciate the time and effort that this takes and thank you for your cooperation and contribution.

When you have completed the questionnaire, please place it in the accompanying envelope and return it to:

<Insert country-specific information here>.

Thank you.

TIMSS ADVANCED 2015

About You

1

MTBG01 **By the end of this school year, how many years will you have been teaching altogether?**

_____ years
*Please **round** to the nearest whole number.*

2

MTBG02 **Are you female or male?**

*Check **one** circle only.*

Female ---
Male ---

3

MTBG03 **How old are you?**

*Check **one** circle only.*

Under 25 ---
25–29 ---
30–39 ---
40–49 ---
50–59 ---
60 or more ---

4

MTBG04 **What is the highest level of formal education you have completed?**

*Check **one** circle only.*

Did not complete <tertiary> education ---

(If you have not completed <tertiary> education, go to #6)

<Short-cycle tertiary education—ISCED Level 5> ---
<Bachelor's or equivalent level—ISCED Level 6> ---
<Master's or equivalent level—ISCED Level 7> ---
<Doctor or equivalent level—ISCED Level 8> ---

5

During your <post-secondary> education, what was your major or main area(s) of study?

*Check **one** circle for each line.*

	Yes	No	
a) Mathematics	○	○	MTBG05A
b) Physics	○	○	MTBG05B
c) Biology	○	○	MTBG05C
d) Chemistry	○	○	MTBG05D
e) <Earth Science>	○	○	MTBG05E
f) Engineering	○	○	MTBG05F
g) Education– Mathematics	○	○	MTBG05G
h) Education– Physics	○	○	MTBG05H
i) Education– Science	○	○	MTBG05I
j) Education– General	○	○	MTBG05J
k) Other	○	○	MTBG05K

School Emphasis on Advanced Mathematics and Physics Education

6

How much do you agree with these statements about advanced mathematics and physics education within your school?

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MTBG06A	a) The school encourages students to study advanced mathematics and physics	○	○	○	○
MTBG06B	b) The school promotes professional development for teachers of advanced mathematics and physics	○	○	○	○
MTBG06C	c) The school provides students with information about career options in advanced mathematics and physics	○	○	○	○
MTBG06D	d) Advanced mathematics and physics teachers are admired by other teachers in the school	○	○	○	○
MTBG06E	e) Teachers have high expectations for student achievement in advanced mathematics and physics	○	○	○	○
MTBG06F	f) Students at this school respect students who excel in advanced mathematics and physics	○	○	○	○
MTBG06G	g) Parents expect their children to study advanced mathematics and physics	○	○	○	○

School Environment

7

Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements.

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
MTBG07A	a) This school is located in a safe neighborhood	○	○	○	○	MTBG07A
MTBG07B	b) I feel safe at this school	○	○	○	○	MTBG07B
MTBG07C	c) This school's security policies and practices are sufficient	○	○	○	○	MTBG07C
MTBG07D	d) The students behave in an orderly manner	○	○	○	○	MTBG07D
MTBG07E	e) The students are respectful of the teachers	○	○	○	○	MTBG07E
MTBG07F	f) The students respect school property	○	○	○	○	MTBG07F
MTBG07G	g) This school has clear rules about student conduct	○	○	○	○	MTBG07G
MTBG07H	h) This school's rules are enforced in a fair and consistent manner	○	○	○	○	MTBG07H

About Being a Teacher

8

In your current school, how severe is each problem?

*Check **one** circle for each line.*

		Not a problem	Minor problem	Moderate problem	Serious problem
MTBG08A	a) The school building needs significant repair	○	○	○	○
MTBG08B	b) Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students)	○	○	○	○
MTBG08C	c) Teachers do not have adequate instructional materials and supplies	○	○	○	○
MTBG08D	d) The school classrooms are not cleaned often enough	○	○	○	○
MTBG08E	e) The school classrooms need maintenance work	○	○	○	○
MTBG08F	f) Teachers do not have adequate technological resources	○	○	○	○
MTBG08G	g) Teachers do not have adequate support for using technology	○	○	○	○

9

How often do you have the following types of interactions with other teachers?

*Check **one** circle for each line.*

		Very often	Often	Sometimes	Never or almost never	
a)	Discuss how to teach a particular topic	○	○	○	○	MTBG09A
b)	Collaborate in planning and preparing instructional materials	○	○	○	○	MTBG09B
c)	Share what I have learned about my teaching experiences	○	○	○	○	MTBG09C
d)	Visit another classroom to learn more about teaching	○	○	○	○	MTBG09D
e)	Work together to try out new ideas	○	○	○	○	MTBG09E
f)	Work as a group on implementing the curriculum	○	○	○	○	MTBG09F
g)	Work with teachers from other grades to ensure continuity in learning	○	○	○	○	MTBG09G

10

How often do you feel the following way about being a teacher?

*Check **one** circle for each line.*

		Very often	Often	Sometimes	Never or almost never
MTBG10A	a) I am content with my profession as a teacher	○	○	○	○
MTBG10B	b) I am satisfied with being a teacher at this school	○	○	○	○
MTBG10C	c) I find my work full of meaning and purpose	○	○	○	○
MTBG10D	d) I am enthusiastic about my job	○	○	○	○
MTBG10E	e) My work inspires me	○	○	○	○
MTBG10F	f) I am proud of the work I do	○	○	○	○
MTBG10G	g) I am going to continue teaching for as long as I can	○	○	○	○

11

Indicate the extent to which you agree or disagree with each of the following statements.

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MTBG11A	a) There are too many students in the classes	○	○	○	○
MTBG11B	b) I have too much material to cover in class	○	○	○	○
MTBG11C	c) I have too many teaching hours	○	○	○	○
MTBG11D	d) I need more time to prepare for class	○	○	○	○
MTBG11E	e) I need more time to assist individual students	○	○	○	○
MTBG11F	f) I feel too much pressure from parents	○	○	○	○
MTBG11G	g) I have difficulty keeping up with all of the changes to the curriculum	○	○	○	○
MTBG11H	h) I have too many administrative tasks	○	○	○	○

About Teaching the TIMSS Class

12

MTBG12 **How many students are in this class?**

_____ students
Write in the number.

13

MTBG13 **How many students in this class experience difficulties understanding spoken <language of test>?**

_____ students in this class
Write in the number.

14

How often do you do the following in teaching this class?

*Check **one** circle for each line.*

		Every or almost every lesson	About half the lessons	Some lessons	Never
MTBG14A	a) Relate the lesson to students' daily lives	○	○	○	○
MTBG14B	b) Ask students to explain their answers	○	○	○	○
MTBG14C	c) Ask students to complete challenging exercises that require them to go beyond the instruction	○	○	○	○
MTBG14D	d) Encourage classroom discussions among students	○	○	○	○
MTBG14E	e) Link new content to students' prior knowledge	○	○	○	○
MTBG14F	f) Ask students to decide their own problem solving procedures	○	○	○	○
MTBG14G	g) Encourage students to express their ideas in class	○	○	○	○

15

In your view, to what extent do the following limit how you teach this class?

*Check **one** circle for each line.*

		Not at all	Some	A lot
MTBG15A	a) Students lacking prerequisite mathematics knowledge or skills	○	○	○
MTBG15B	b) Students suffering from lack of basic nutrition	○	○	○
MTBG15C	c) Students suffering from not enough sleep	○	○	○
MTBG15D	d) Students with physical disabilities	○	○	○
MTBG15E	e) Students with mental, emotional, or psychological disabilities	○	○	○

Teaching Advanced Mathematics to the TIMSS Class

16

MTBM16

In a typical week, how much time do you spend teaching advanced mathematics to the students in this class?

_____ minutes per week

Write in the number of minutes per week.
Please convert the number of instructional hours or periods into minutes.

17

MTBM17

How many minutes per week do you usually spend preparing to teach this class?

_____ minutes per week

Write in the number of minutes per week.
Please convert the number of hours into minutes.

18

In teaching advanced mathematics to this class, how would you characterize your confidence in doing the following?

*Check **one** circle for each line.*

	Very high	High	Medium	Low	
a) Inspiring students to learn advanced mathematics	○	○	○	○	MTBM18A
b) Showing students a variety of problem solving strategies	○	○	○	○	MTBM18B
c) Providing challenging tasks for the highest achieving students	○	○	○	○	MTBM18C
d) Adapting my teaching to engage students' interest	○	○	○	○	MTBM18D
e) Helping students appreciate the value of learning advanced mathematics	○	○	○	○	MTBM18E
f) Assessing student comprehension of advanced mathematics	○	○	○	○	MTBM18F
g) Improving the understanding of struggling students	○	○	○	○	MTBM18G
h) Making advanced mathematics relevant to students	○	○	○	○	MTBM18H
i) Developing students' higher-order thinking skills	○	○	○	○	MTBM18I

Technology for Teaching Mathematics to the TIMSS class

19

In teaching advanced mathematics to this class, how often do you ask students to do the following?

*Check **one** circle for each line.*

		Every or almost every lesson	About half the lessons	Some lessons	Never
MTBM19A	a) Listen to me explain new mathematics content	○	○	○	○
MTBM19B	b) Listen to me explain how to solve problems	○	○	○	○
MTBM19C	c) Memorize rules, formulas, procedures, and facts	○	○	○	○
MTBM19D	d) Work problems (individually or with peers) with my guidance	○	○	○	○
MTBM19E	e) Work problems together in the whole class with direct guidance from me	○	○	○	○
MTBM19F	f) Work problems (individually or with peers) while I am occupied by other tasks	○	○	○	○
MTBM19G	g) Solve problems like the examples in their textbooks	○	○	○	○
MTBM19H	h) Discuss problem solving strategies	○	○	○	○
MTBM19I	i) Work on problems for which there is no immediately obvious method of solution	○	○	○	○
MTBM19J	j) Communicate their arguments	○	○	○	○
MTBM19K	k) Take a written test or quiz	○	○	○	○

20

A. Do the students in this class have computers, tablets, calculators, or smartphones available to use during their advanced mathematics lessons? MTBM20A

*Check **one** circle only.*

Yes ○
No ○ → **(If No, go to #21)**

If Yes,

B. How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during advanced mathematics lessons?

*Check **one** circle for each line.*

		Every or almost every day	Once or twice a week	Once or twice a month	Never or almost never
MTBM20BA	a) Read the textbook or course materials in digital format	○	○	○	○
MTBM20BB	b) Look up ideas and information	○	○	○	○
MTBM20BC	c) Process and analyze data	○	○	○	○
MTBM20BD	d) Draw graphs of functions	○	○	○	○
MTBM20BE	e) Solve equations	○	○	○	○
MTBM20BF	f) Manipulate algebraic expressions	○	○	○	○
MTBM20BG	g) Conduct modeling and simulations	○	○	○	○
MTBM20BH	h) Perform numerical integration	○	○	○	○

Advanced Mathematics Topics Taught to the TIMSS class

21

The following list includes the main topics addressed by the TIMSS Advanced mathematics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

*Check **one** circle for each line.*

		Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
	A. Algebra			
MTBM21AA	a) Operations with exponential, logarithmic, polynomial, rational, and radical expressions	○	○	○
MTBM21AB	b) Operations with complex numbers	○	○	○
MTBM21AC	c) Evaluating algebraic expressions (e.g., exponential, logarithmic, polynomial, rational, and radical)	○	○	○
MTBM21AD	d) The nth term of arithmetic and geometric sequences and the sums of finite and infinite series	○	○	○
MTBM21AE	e) Linear, simultaneous, and quadratic equations and inequalities; radical equations, logarithmic, and exponential equations	○	○	○
MTBM21AF	f) Slopes, y-axis intercepts, and points of intersection of straight lines	○	○	○
MTBM21AG	g Equivalent representations of functions, including composite functions, as ordered pairs, tables, graphs, formulas, or words	○	○	○
MTBM21AH	h) Properties of functions including domain and range	○	○	○
	B. Calculus			
MTBM21BA	a) Limits of functions	○	○	○
MTBM21BB	b) Conditions for continuity and differentiability of functions	○	○	○
MTBM21BC	c) Differentiation of functions (including polynomial, exponential, logarithmic, trigonometric, rational, and radical functions); differentiation of products, quotients, and composite functions	○	○	○
MTBM21BD	d) Using derivatives to solve problems (e.g., in optimization and rates of change)	○	○	○
MTBM21BE	e) Using first and second derivatives to determine slope and local extrema of functions	○	○	○
MTBM21BF	f) Using derivatives to determine points of inflection of functions	○	○	○
MTBM21BG	g) Integrating functions (including polynomial, exponential, trigonometric, and rational functions); evaluating definite integrals, including calculation of areas	○	○	○
	C. Geometry			
MTBM21CA	a) Properties of geometric figures in two and three dimensions	○	○	○
MTBM21CB	b) Properties of vectors and their sums and differences	○	○	○
MTBM21CC	c) Trigonometric properties of triangles (sine, cosine, and tangent)	○	○	○
MTBM21CD	d) Trigonometric functions and their graphs	○	○	○

Mathematics Homework for the TIMSS class

22

MTBM22A **A. Do you assign mathematics homework to this class?**

*Check **one** circle only.*

Yes ---
No ---

(If No, go to #23)

If Yes,

B. How often do you assign the following kinds of mathematics homework to this class?

*Check **one** circle for each line.*

		Always or almost always	Sometimes	Never or almost never
MTBM22BA	a) Doing problem/question sets			
MTBM22BB	b) Reading the textbook			
MTBM22BC	c) Memorizing formulas and procedures			
MTBM22BD	d) Gathering, analyzing, and reporting data			
MTBM22BE	e) Finding one or more applications of the content covered			
MTBM22BF	f) Working on projects			

C. How often do you do the following with the mathematics homework assignments for this class?

*Check **one** circle for each line.*

		Always or almost always	Sometimes	Never or almost never
MTBM22CA	a) Correct assignments and give feedback to students			
MTBM22CB	b) Have students correct their own homework			
MTBM22CC	c) Discuss the homework in class			
MTBM22CD	d) Monitor whether or not the homework was completed			
MTBM22CE	e) Use the homework to contribute towards students' grades or marks			

Professional Development and Activities

23

In the past two years, have you participated in professional development in any of the following?

*Check **one** circle for each line.*

		Yes	No
MTBM23A	a) Mathematics content	◯	◯
MTBM23B	b) Mathematics pedagogy/instruction	◯	◯
MTBM23C	c) Mathematics curriculum	◯	◯
MTBM23D	d) Integrating information technology into mathematics	◯	◯
MTBM23E	e) Improving students' critical thinking or problem solving skills	◯	◯
MTBM23F	f) Mathematics assessment	◯	◯
MTBM23G	g) Addressing individual students' needs	◯	◯

24

MTBM24

In the past two years, how many hours in total have you spent in formal <in-service/professional development> (e.g., workshops, seminars, etc.) for mathematics?

*Check **one** circle only.*

- None ◯
- Less than 6 hours ◯
- 6–15 hours ◯
- 16–35 hours ◯
- More than 35 hours ◯

25

MTBM25

By the end of this school year, how many years will you have taught mathematics at the advanced level?

_____ years
Number of years taught advanced mathematics

26

A. Are you a member of <professional organization for mathematics teachers>? MTBM26A

*Check **one** circle only.*

- Yes ◯
- No ◯

B. In the past two years, have you regularly participated in activities sponsored by <professional organization for mathematics teachers>? MTBM26B

*Check **one** circle only.*

- Yes ◯
- No ◯

27

In the past two years, have you taken part in any of the following activities in mathematics?

*Check **one** circle for each line.*

		Yes	No	
a)	I attended a workshop or conference	◯	◯	MTBM27A
b)	I gave a presentation at a workshop or conference	◯	◯	MTBM27B
c)	I took part in an innovative project for curriculum and instruction	◯	◯	MTBM27C

Thank You

Thank you for the thought, time, and effort you have put into completing this questionnaire.

BOSTON COLLEGE

TIMSS Advanced 2015

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Teacher Questionnaire Advanced Mathematics

International Association for the Evaluation of Educational Achievement

timss.bc.edu

TIMSS Advanced 2015

SECTION 4: PHYSICS TEACHER QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-01	PTBG01	By the end of this school year, how many years will you have been teaching altogether?	PT2GTAUT	
TQG-02	PTBG02	Are you female or male?	PT2GSEX	
TQG-03	PTBG03	How old are you?	PT2GAGE	
TQG-04	PTBG04	What is the highest level of formal education you have completed?	PT2GFEDC	Modified response options in 2015
TQG-05a	PTBG05A	During your <post-secondary> education, what was your major or main area(s) of study? Mathematics	PT2GPSMA	
TQG-05b	PTBG05B	During your <post-secondary> education, what was your major or main area(s) of study? Physics	PT2GPSPH	
TQG-05c	PTBG05C	During your <post-secondary> education, what was your major or main area(s) of study? Biology	PT2GPSBI	
TQG-05d	PTBG05D	During your <post-secondary> education, what was your major or main area(s) of study? Chemistry	PT2GPSCH	
TQG-05e	PTBG05E	During your <post-secondary> education, what was your major or main area(s) of study? <Earth Science>		
TQG-05f	PTBG05F	During your <post-secondary> education, what was your major or main area(s) of study? Engineering	PT2GPSEN	
TQG-05g	PTBG05G	During your <post-secondary> education, what was your major or main area(s) of study? Education– Mathematics	PT2GPSEM	
TQG-05h	PTBG05H	During your <post-secondary> education, what was your major or main area(s) of study? Education– Physics		
TQG-05i	PTBG05I	During your <post-secondary> education, what was your major or main area(s) of study? Education– Science	PT2GPSES	
TQG-05j	PTBG05J	During your <post-secondary> education, what was your major or main area(s) of study? Education– General	PT2GPSEG	
TQG-05k	PTBG05K	During your <post-secondary> education, what was your major or main area(s) of study? Other	PT2GPSOT	
TQG-06a	PTBG06A	How much do you agree with these statements about advanced mathematics and physics education within your school? The school encourages students to study advanced mathematics and physics		
TQG-06b	PTBG06B	How much do you agree with these statements about advanced mathematics and physics education within your school? The school promotes professional development for teachers of advanced mathematics and physics		
TQG-06c	PTBG06C	How much do you agree with these statements about advanced mathematics and physics education within your school? The school provides students with information about career options in advanced mathematics and physics		
TQG-06d	PTBG06D	How much do you agree with these statements about advanced mathematics and physics education within your school? Advanced mathematics and physics teachers are admired by other teachers in the school		
TQG-06e	PTBG06E	How much do you agree with these statements about advanced mathematics and physics education within your school? Teachers have high expectations for student achievement in advanced mathematics and physics		
TQG-06f	PTBG06F	How much do you agree with these statements about advanced mathematics and physics education within your school? Students at this school respect students who excel in advanced mathematics and physics		
TQG-06g	PTBG06G	How much do you agree with these statements about advanced mathematics and physics education within your school? Parents expect their children to study advanced mathematics and physics		

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-07a	PTBG07A	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school is located in a safe neighborhood	PT2GCUSN	Modified response options in 2015
TQG-07b	PTBG07B	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. I feel safe at this school	PT2GCUSA	Modified response options in 2015
TQG-07c	PTBG07C	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school's security policies and practices are sufficient	PT2GCUSP	Modified response options in 2015
TQG-07d	PTBG07D	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. The students behave in an orderly manner		
TQG-07e	PTBG07E	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. The students are respectful of the teachers		
TQG-07f	PTBG07F	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. The students respect school property		
TQG-07g	PTBG07G	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school has clear rules about student conduct		
TQG-07h	PTBG07H	Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements. This school's rules are enforced in a fair and consistent manner		
TQG-08a	PTBG08A	In your current school, how severe is each problem? The school building needs significant repair	PT2GSPBR	Modified response options in 2015
TQG-08b	PTBG08B	In your current school, how severe is each problem? Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students)		
TQG-08c	PTBG08C	In your current school, how severe is each problem? Teachers do not have adequate instructional materials and supplies		
TQG-08d	PTBG08D	In your current school, how severe is each problem? The school classrooms are not cleaned often enough		
TQG-08e	PTBG08E	In your current school, how severe is each problem? The school classrooms need maintenance work		
TQG-08f	PTBG08F	In your current school, how severe is each problem? Teachers do not have adequate technological resources		
TQG-08g	PTBG08G	In your current school, how severe is each problem? Teachers do not have adequate support for using technology		
TQG-09a	PTBG09A	How often do you have the following types of interactions with other teachers? Discuss how to teach a particular topic		
TQG-09b	PTBG09B	How often do you have the following types of interactions with other teachers? Collaborate in planning and preparing instructional materials		
TQG-09c	PTBG09C	How often do you have the following types of interactions with other teachers? Share what I have learned about my teaching experiences		
TQG-09d	PTBG09D	How often do you have the following types of interactions with other teachers? Visit another classroom to learn more about teaching		
TQG-09e	PTBG09E	How often do you have the following types of interactions with other teachers? Work together to try out new ideas		
TQG-09f	PTBG09F	How often do you have the following types of interactions with other teachers? Work as a group on implementing the curriculum		

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-09g	PTBG09G	How often do you have the following types of interactions with other teachers? Work with teachers from other grades to ensure continuity in learning		
TQG-10a	PTBG10A	How often do you feel the following way about being a teacher? I am content with my profession as a teacher		
TQG-10b	PTBG10B	How often do you feel the following way about being a teacher? I am satisfied with being a teacher at this school		
TQG-10c	PTBG10C	How often do you feel the following way about being a teacher? I find my work full of meaning and purpose		
TQG-10d	PTBG10D	How often do you feel the following way about being a teacher? I am enthusiastic about my job		
TQG-10e	PTBG10E	How often do you feel the following way about being a teacher? My work inspires me		
TQG-10f	PTBG10F	How often do you feel the following way about being a teacher? I am proud of the work I do		
TQG-10g	PTBG10G	How often do you feel the following way about being a teacher? I am going to continue teaching for as long as I can		
TQG-11a	PTBG11A	Indicate the extent to which you agree or disagree with each of the following statements. There are too many students in the classes		
TQG-11b	PTBG11B	Indicate the extent to which you agree or disagree with each of the following statements. I have too much material to cover in class		
TQG-11c	PTBG11C	Indicate the extent to which you agree or disagree with each of the following statements. I have too many teaching hours		
TQG-11d	PTBG11D	Indicate the extent to which you agree or disagree with each of the following statements. I need more time to prepare for class		
TQG-11e	PTBG11E	Indicate the extent to which you agree or disagree with each of the following statements. I need more time to assist individual students		
TQG-11f	PTBG11F	Indicate the extent to which you agree or disagree with each of the following statements. I feel too much pressure from parents		
TQG-11g	PTBG11G	Indicate the extent to which you agree or disagree with each of the following statements. I have difficulty keeping up with all of the changes to the curriculum		
TQG-11h	PTBG11H	Indicate the extent to which you agree or disagree with each of the following statements. I have too many administrative tasks		
TQG-12	PTBG12	How many students are in this class?	PT2PSTUD	Modified wording in 2015
TQG-13	PTBG13	How many students in this class experience difficulties understanding spoken <language of test>?		
TQG-14a	PTBG14A	How often do you do the following in teaching this class? Relate the lesson to students' daily lives	PT2PTPDL	Modified wording in 2015
TQG-14b	PTBG14B	How often do you do the following in teaching this class? Ask students to explain their answers		
TQG-14c	PTBG14C	How often do you do the following in teaching this class? Ask students to complete challenging exercises that require them to go beyond the instruction		
TQG-14d	PTBG14D	How often do you do the following in teaching this class? Encourage classroom discussions among students		
TQG-14e	PTBG14E	How often do you do the following in teaching this class? Link new content to students' prior knowledge		
TQG-14f	PTBG14F	How often do you do the following in teaching this class? Ask students to decide their own problem solving procedures		
TQG-14g	PTBG14G	How often do you do the following in teaching this class? Encourage students to express their ideas in class		
TQG-15a	PTBG15A	In your view, to what extent do the following limit how you teach this class? Students lacking prerequisite mathematics knowledge or skills		

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQG-15b	PTBG15B	In your view, to what extent do the following limit how you teach this class? Students suffering from lack of basic nutrition		
TQG-15c	PTBG15C	In your view, to what extent do the following limit how you teach this class. Students suffering from not enough sleep		
TQG-15d	PTBG15D	In your view, to what extent do the following limit how you teach this class? Students with physical disabilities		
TQG-15e	PTBG15E	In your view, to what extent do the following limit how you teach this class? Students with mental, emotional, or psychological disabilities		
TQP-16	PTBP16	In a typical week, how much time do you spend teaching physics to the students in this class? (minutes per week)	PT2PTIMT	Modified wording in 2015
TQP-17	PTBP17	How many minutes per week do you usually spend preparing to teach this class?	PT2PTIPM	Modified wording in 2015
TQP-18a	PTBP18A	In teaching physics to this class, how would you characterize your confidence in doing the following? Inspiring students to learn physics		
TQP-18b	PTBP18B	In teaching physics to this class, how would you characterize your confidence in doing the following? Explaining physics concepts or principles by doing physics experiments		
TQP-18c	PTBP18C	In teaching physics to this class, how would you characterize your confidence in doing the following? Providing challenging tasks for the highest achieving students		
TQP-18d	PTBP18D	In teaching physics to this class, how would you characterize your confidence in doing the following? Adapting my teaching to engage students' interest		
TQP-18e	PTBP18E	In teaching physics to this class, how would you characterize your confidence in doing the following? Helping students appreciate the value of learning physics		
TQP-18f	PTBP18F	In teaching physics to this class, how would you characterize your confidence in doing the following? Assessing student comprehension of physics		
TQP-18g	PTBP18G	In teaching physics to this class, how would you characterize your confidence in doing the following? Improving the understanding of struggling students		
TQP-18h	PTBP18H	In teaching physics to this class, how would you characterize your confidence in doing the following? Making physics relevant to students		
TQP-18i	PTBP18I	In teaching physics to this class, how would you characterize your confidence in doing the following? Developing students' higher-order thinking skills		
TQP-18j	PTBP18J	In teaching physics to this class, how would you characterize your confidence in doing the following? Teaching physics using inquiry methods		
TQP-19a	PTBP19A	In teaching physics to this class, how often do you ask students to do the following? Listen to me explain new physics content		
TQP-19b	PTBP19B	In teaching physics to this class, how often do you ask students to do the following? Observe natural phenomena and describe what they see		
TQP-19c	PTBP19C	In teaching physics to this class, how often do you ask students to do the following? Watch me demonstrate an experiment, investigation, or simulation	PT2PTPWE	Modified wording in 2015
TQP-19d	PTBP19D	In teaching physics to this class, how often do you ask students to do the following? Design or plan experiments, investigations, or simulations		
TQP-19e	PTBP19E	In teaching physics to this class, how often do you ask students to do the following? Conduct experiments, investigations, or simulations	PT2PTPCE	Modified wording in 2015
TQP-19f	PTBP19F	In teaching physics to this class, how often do you ask students to do the following? Present data from experiments, investigations, or simulations		
TQP-19g	PTBP19G	In teaching physics to this class, how often do you ask students to do the following? Interpret data from experiments, investigations, or simulations		
TQP-19h	PTBP19H	In teaching physics to this class, how often do you ask students to do the following? Use evidence from experiments, investigations, or simulations to support conclusions		

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQP-19i	PTBP19I	In teaching physics to this class, how often do you ask students to do the following? Read their textbooks or other resource materials	PT2PTPRT	Modified wording in 2015
TQP-19j	PTBP19J	In teaching physics to this class, how often do you ask students to do the following? Have students memorize facts and principles		
TQP-19k	PTBP19K	In teaching physics to this class, how often do you ask students to do the following? Use scientific formulas and laws to solve routine problems	PT2PTPSP	Modified wording in 2015
TQP-19l	PTBP19L	In teaching physics to this class, how often do you ask students to do the following? Do field work outside of class		
TQP-19m	PTBP19M	In teaching physics to this class, how often do you ask students to do the following? Take a written test or quiz		
TQP-20A	PTBP20A	Do the students in this class have computers, tablets, calculators, or smartphones available to use during their physics lessons?		
TQP-20Ba	PTBP20BA	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Read the textbook or course materials in digital format		
TQP-20Bb	PTBP20BB	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Look up ideas and information		
TQP-20Bc	PTBP20BC	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Process and analyze data		
TQP-20Bd	PTBP20BD	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Draw graphs of functions		
TQP-20Be	PTBP20BE	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Solve equations		
TQP-20Bf	PTBP20BF	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Manipulate algebraic expressions		
TQP-20Bg	PTBP20BG	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Conduct modeling and simulations		
TQP-20Bh	PTBP20BH	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Perform numerical integration		
TQP-20Bi	PTBP20BI	How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons? Do scientific procedures or experiments		
TQP-21A	PTBP21A	Does your school have a physics laboratory?		
TQP-21B	PTBP21B	Do teachers usually have assistance available when students are conducting physics experiments?		
TQP-22Aa	PTBP22AA	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: Applying Newton's laws and laws of motion	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ab	PTBP22AB	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: Forces, including frictional force, acting on a body	See Question TQ3P-24 in 2008 for subtopics.	

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQP-22Ac	PTBP22AC	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ad	PTBP22AD	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: The law of gravitation in relation to the movement of celestial objects	See Question TQ3P-24 in 2008 for subtopics.	
TQP-22Ae	PTBP22AE	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: Kinetic and potential energy; conservation of mechanical energy	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Af	PTBP22AF	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: The law of conservation of momentum; elastic and inelastic collisions	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ag	PTBP22AG	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: The first law of thermodynamics	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ah	PTBP22AH	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: Heat transfer and specific heat capacities	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ai	PTBP22AI	When students in this class have been taught each of the following physics topics. Mechanics and Thermodynamics: The law of ideal gases; expansion of solids and liquids in relation to temperature change	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ba	PTBP22BA	When students in this class have been taught each of the following physics topics. Electricity and Magnetism: Electrostatic attraction or repulsion between isolated charged particles – Coulomb's law	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Bb	PTBP22BB	When students in this class have been taught each of the following physics topics. Electricity and Magnetism: Charged particles in an electric field	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Bc	PTBP22BC	When students in this class have been taught each of the following physics topics. Electricity and Magnetism: Electrical circuits; using Ohm's law and Joule's law	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Bd	PTBP22BD	When students in this class have been taught each of the following physics topics. Electricity and Magnetism: Charged particles in a magnetic field	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Be	PTBP22BE	When students in this class have been taught each of the following physics topics. Electricity and Magnetism: Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction	See Question TQP3-24 in 2008 for subtopics.	

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQP-22Bf	PTBP22BF	When students in this class have been taught each of the following physics topics. Electricity and Magnetism: Faraday's and Lenz's laws of induction	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ca	PTBP22CA	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: Mechanical waves; the relationship between speed, frequency, and wavelength	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Cb	PTBP22CB	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays)	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Cc	PTBP22CC	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: Thermal radiation, temperature, and wavelength	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Cd	PTBP22CD	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: Reflection, refraction, interference, and diffraction	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Ce	PTBP22CE	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Cf	PTBP22CF	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: Wave-particle duality and the photoelectric effect; types of nuclear reactions and their role in nature (e.g., in stars) and society; radioactive isotopes	See Question TQP3-24 in 2008 for subtopics.	
TQP-22Cg	PTBP22CG	When students in this class have been taught each of the following physics topics. Wave Phenomena and Atomic/Nuclear Physics: Mass-energy equivalence in nuclear reactions and particle transformations	See Question TQP3-24 in 2008 for subtopics.	
TQP-23A	PTBP23A	Do you assign physics homework to this class?	PT2PHMWP	Modified wording in 2015
TQP-23Ba	PTBP23BA	How often do you assign the following kinds of physics homework to this class? Doing problem/question sets	PT2PKPHS	Modified wording in 2015
TQP-23Bb	PTBP23BB	How often do you assign the following kinds of physics homework to this class? Reading the textbook	PT2PKPHR	Modified wording in 2015
TQP-23Bc	PTBP23BC	How often do you assign the following kinds of physics homework to this class? Memorizing formulas and procedures	PT2PKPHM	Modified wording in 2015
TQP-23Bd	PTBP23BD	How often do you assign the following kinds of physics homework to this class? Gathering, analyzing, and reporting data	PT2PKPHG	Modified wording in 2015
TQP-23Be	PTBP23BE	How often do you assign the following kinds of physics homework to this class? Finding one or more applications of the content covered	PT2PKPHF	Modified wording in 2015
TQP-23Bf	PTBP23BF	How often do you assign the following kinds of physics homework to this class? Working on projects	PT2PKPHP	Modified wording in 2015
TQP-23Ca	PTBP23CA	How often do you do the following with the physics homework assignments for this class? Correct assignments and give feedback to students		
TQP-23Cb	PTBP23CB	How often do you do the following with the physics homework assignments for this class? Have students correct their own homework		
TQP-23Cc	PTBP23CC	How often do you do the following with the physics homework assignments for this class? Discuss the homework in class		

Exhibit S1.4: Index of International Background Variables for the TIMSS Advanced 2015 Physics Teacher Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
TQP-23Cd	PTBP23CD	How often do you do the following with the physics homework assignments for this class? Monitor whether or not the homework was completed		
TQP-23Ce	PTBP23CE	How often do you do the following with the physics homework assignments for this class? Use the homework to contribute towards students' grades or marks		
TQP-24a	PTBP24A	In the past two years, have you participated in professional development in any of the following? Physics content	PT2PPDPT	
TQP-24b	PTBP24B	In the past two years, have you participated in professional development in any of the following? Physics pedagogy/instruction	PT2PPDPP	
TQP-24c	PTBP24C	In the past two years, have you participated in professional development in any of the following? Physics curriculum	PT2PPDPC	
TQP-24d	PTBP24D	In the past two years, have you participated in professional development in any of the following? Integrating information technology into physics	PT2PPDPI	
TQP-24e	PTBP24E	In the past two years, have you participated in professional development in any of the following? Improving students' critical thinking or inquiry skills	PT2PPDIM	
TQP-24f	PTBP24F	In the past two years, have you participated in professional development in any of the following? Physics assessment	PT2PPDPA	
TQP-24g	PTBP24G	In the past two years, have you participated in professional development in any of the following? Addressing individual students' needs		
TQP-25	PTBP25	In the past two years, how many hours in total have you spent in formal <in-service/professional development> (e.g., workshops, seminars, etc.) for physics?		
TQP-26	PTBP26	By the end of this school year, how many years will you have taught physics at the advanced level?	PT2PTPHY	Modified wording in 2015
TQP-27A	PTBP27A	Are you a member of <professional organization for physics teachers>?	PT2PMPOP	
TQP-27B	PTBP27B	In the past two years, have you regularly participated in activities sponsored by <professional organization for physics teachers>?	PT2PRPPO	Modified wording in 2015
TQP-28a	PTBP28A	In the past two years, have you taken part in any of the following activities in physics? I attended a workshop or conference	PT2PACWC	
TQP-28b	PTBP28B	In the past two years, have you taken part in any of the following activities in physics? I gave a presentation at a workshop or conference	PT2PACGP	
TQP-28c	PTBP28C	In the past two years, have you taken part in any of the following activities in physics? I took part in an innovative project for curriculum and instruction	PT2PAPIP	

TIMSS Advanced 2015

Identification Label

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Teacher Questionnaire Physics

<TIMSS National Research Center Name>
<Address>

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

Teacher *Questionnaire—Physics*

Your school has agreed to participate in TIMSS Advanced 2015 (Trends in International Mathematics and Science Study), an educational research project sponsored by the International Association for the Evaluation of Educational Achievement (IEA). TIMSS Advanced measures trends in student achievement in advanced mathematics and physics and studies differences in national education systems in order to help improve teaching and learning worldwide.

This questionnaire is addressed to teachers of <twelfth grade> students, and seeks information about teachers' academic and professional backgrounds, classroom resources, instructional practices, and attitudes toward teaching. Since your class has been selected as part of a nationwide sample, your responses are very important in helping to describe the school system in <country>.

Some of the questions in the questionnaire refer to the "**TIMSS class**" or "**this class**". This is the class that is identified on the front of this booklet, and which will be tested as part of TIMSS Advanced in your school. It is important that you answer each question carefully so that the information that you provide reflects your situation as accurately as possible.

Since TIMSS Advanced is an international study and all countries are using the same questionnaire, you may find that some of the questions seem unusual or are not entirely relevant to you or schools in <country>. Nevertheless, it is important that you do your best to answer all of the questions so comparisons can be made across countries in the studies.

It is estimated that you will need approximately 35 minutes to complete this questionnaire. We appreciate the time and effort that this takes and thank you for your cooperation and contribution.

When you have completed the questionnaire, please place it in the accompanying envelope and return it to:

<Insert country-specific information here>.

Thank you.

TIMSS ADVANCED 2015

About You

1

PTBG01 **By the end of this school year, how many years will you have been teaching altogether?**

_____ years

*Please **round** to the nearest whole number.*

2

PTBG02 **Are you female or male?**

*Check **one** circle only.*

Female ---

Male ---

3

PTBG03 **How old are you?**

*Check **one** circle only.*

Under 25 ---

25–29 ---

30–39 ---

40–49 ---

50–59 ---

60 or more ---

4

PTBG04 **What is the highest level of formal education you have completed?**

*Check **one** circle only.*

Did not complete <tertiary> education ---

(If you have not completed <tertiary> education, go to #6)

<Short-cycle tertiary education—ISCED Level 5> ---

<Bachelor's or equivalent level—ISCED Level 6> ---

<Master's or equivalent level—ISCED Level 7> ---

<Doctor or equivalent level—ISCED Level 8> ---

5

During your <post-secondary> education, what was your major or main area(s) of study?

*Check **one** circle for each line.*

	Yes	No	
a) Mathematics	◯	◯	PTBG05A
b) Physics	◯	◯	PTBG05B
c) Biology	◯	◯	PTBG05C
d) Chemistry	◯	◯	PTBG05D
e) <Earth Science>	◯	◯	PTBG05E
f) Engineering	◯	◯	PTBG05F
g) Education– Mathematics	◯	◯	PTBG05G
h) Education– Physics	◯	◯	PTBG05H
i) Education– Science	◯	◯	PTBG05I
j) Education– General	◯	◯	PTBG05J
k) Other	◯	◯	PTBG05K

School Emphasis on Advanced Mathematics and Physics Education

6 **How much do you agree with these statements about advanced mathematics and physics education within your school?**

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PTBG06A	a) The school encourages students to study advanced mathematics and physics	○	○	○	○
PTBG06B	b) The school promotes professional development for teachers of advanced mathematics and physics	○	○	○	○
PTBG06C	c) The school provides students with information about career options in advanced mathematics and physics	○	○	○	○
PTBG06D	d) Advanced mathematics and physics teachers are admired by other teachers in the school	○	○	○	○
PTBG06E	e) Teachers have high expectations for student achievement in advanced mathematics and physics	○	○	○	○
PTBG06F	f) Students at this school respect students who excel in advanced mathematics and physics	○	○	○	○
PTBG06G	g) Parents expect their children to study advanced mathematics and physics	○	○	○	○

School Environment

7 **Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements.**

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot	
PTBG07A	a) This school is located in a safe neighborhood	○	○	○	○	PTBG07A
PTBG07B	b) I feel safe at this school	○	○	○	○	PTBG07B
PTBG07C	c) This school's security policies and practices are sufficient	○	○	○	○	PTBG07C
PTBG07D	d) The students behave in an orderly manner	○	○	○	○	PTBG07D
PTBG07E	e) The students are respectful of the teachers	○	○	○	○	PTBG07E
PTBG07F	f) The students respect school property	○	○	○	○	PTBG07F
PTBG07G	g) This school has clear rules about student conduct	○	○	○	○	PTBG07G
PTBG07H	h) This school's rules are enforced in a fair and consistent manner	○	○	○	○	PTBG07H

About Being a Teacher

8

In your current school, how severe is each problem?

*Check **one** circle for each line.*

		Not a problem	Minor problem	Moderate problem	Serious problem
PTBG08A	a) The school building needs significant repair	○	○	○	○
PTBG08B	b) Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students)	○	○	○	○
PTBG08C	c) Teachers do not have adequate instructional materials and supplies	○	○	○	○
PTBG08D	d) The school classrooms are not cleaned often enough	○	○	○	○
PTBG08E	e) The school classrooms need maintenance work	○	○	○	○
PTBG08F	f) Teachers do not have adequate technological resources	○	○	○	○
PTBG08G	g) Teachers do not have adequate support for using technology	○	○	○	○

9

How often do you have the following types of interactions with other teachers?

*Check **one** circle for each line.*

		Very often	Often	Sometimes	Never or almost never	
	a) Discuss how to teach a particular topic	○	○	○	○	PTBG09A
	b) Collaborate in planning and preparing instructional materials	○	○	○	○	PTBG09B
	c) Share what I have learned about my teaching experiences	○	○	○	○	PTBG09C
	d) Visit another classroom to learn more about teaching	○	○	○	○	PTBG09D
	e) Work together to try out new ideas	○	○	○	○	PTBG09E
	f) Work as a group on implementing the curriculum	○	○	○	○	PTBG09F
	g) Work with teachers from other grades to ensure continuity in learning	○	○	○	○	PTBG09G

10

How often do you feel the following way about being a teacher?

*Check **one** circle for each line.*

		Very often	Often	Sometimes	Never or almost never
PTBG10A	a) I am content with my profession as a teacher	○	○	○	○
PTBG10B	b) I am satisfied with being a teacher at this school	○	○	○	○
PTBG10C	c) I find my work full of meaning and purpose	○	○	○	○
PTBG10D	d) I am enthusiastic about my job	○	○	○	○
PTBG10E	e) My work inspires me	○	○	○	○
PTBG10F	f) I am proud of the work I do	○	○	○	○
PTBG10G	g) I am going to continue teaching for as long as I can	○	○	○	○

11

Indicate the extent to which you agree or disagree with each of the following statements.

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
PTBG11A	a) There are too many students in the classes	○	○	○	○
PTBG11B	b) I have too much material to cover in class	○	○	○	○
PTBG11C	c) I have too many teaching hours	○	○	○	○
PTBG11D	d) I need more time to prepare for class	○	○	○	○
PTBG11E	e) I need more time to assist individual students	○	○	○	○
PTBG11F	f) I feel too much pressure from parents	○	○	○	○
PTBG11G	g) I have difficulty keeping up with all of the changes to the curriculum	○	○	○	○
PTBG11H	h) I have too many administrative tasks	○	○	○	○

About Teaching the TIMSS Class

12

PTBG12 **How many students are in this class?**

_____ students
Write in the number.

13

PTBG13 **How many students in this class experience difficulties understanding spoken <language of test>?**

_____ students in this class
Write in the number.

14

How often do you do the following in teaching this class?

*Check **one** circle for each line.*

	Every or almost every lesson	About half the lessons	Some lessons	Never
PTBG14A a) Relate the lesson to students' daily lives	○	○	○	○
PTBG14B b) Ask students to explain their answers	○	○	○	○
PTBG14C c) Ask students to complete challenging exercises that require them to go beyond the instruction	○	○	○	○
PTBG14D d) Encourage classroom discussions among students	○	○	○	○
PTBG14E e) Link new content to students' prior knowledge	○	○	○	○
PTBG14F f) Ask students to decide their own problem solving procedures	○	○	○	○
PTBG14G g) Encourage students to express their ideas in class	○	○	○	○

15

In your view, to what extent do the following limit how you teach this class?

*Check **one** circle for each line.*

	Not at all	Some	A lot
PTBG15A a) Students lacking prerequisite mathematics knowledge or skills	○	○	○
PTBG15B b) Students suffering from lack of basic nutrition	○	○	○
PTBG15C c) Students suffering from not enough sleep	○	○	○
PTBG15D d) Students with physical disabilities	○	○	○
PTBG15E e) Students with mental, emotional, or psychological disabilities	○	○	○

Teaching Physics to the TIMSS Class

16

PTBP16

In a typical week, how much time do you spend teaching physics to the students in this class?

_____ minutes per week
Write in the number of minutes per week.
Please convert the number of instructional hours or periods into minutes.

17

PTBP17

How many minutes per week do you usually spend preparing to teach this class?

_____ minutes per week
Write in the number of minutes per week.
Please convert the number of hours into minutes.

18

In teaching physics to this class, how would you characterize your confidence in doing the following?

*Check **one** circle for each line.*

	Very high	High	Medium	Low	
a) Inspiring students to learn physics	○	○	○	○	PTBP18A
b) Explaining physics concepts or principles by doing physics experiments	○	○	○	○	PTBP18B
c) Providing challenging tasks for the highest achieving students	○	○	○	○	PTBP18C
d) Adapting my teaching to engage students' interest	○	○	○	○	PTBP18D
e) Helping students appreciate the value of learning physics	○	○	○	○	PTBP18E
f) Assessing student comprehension of physics	○	○	○	○	PTBP18F
g) Improving the understanding of struggling students	○	○	○	○	PTBP18G
h) Making physics relevant to students	○	○	○	○	PTBP18H
i) Developing students' higher-order thinking skills	○	○	○	○	PTBP18I
j) Teaching physics using inquiry methods	○	○	○	○	PTBP18J

19

In teaching physics to this class, how often do you ask students to do the following?

*Check **one** circle for each line.*

		Every or almost every lesson	About half the lessons	Some lessons	Never
PTBP19A	a) Listen to me explain new physics content	○	○	○	○
PTBP19B	b) Observe natural phenomena and describe what they see	○	○	○	○
PTBP19C	c) Watch me demonstrate an experiment, investigation, or simulation	○	○	○	○
PTBP19D	d) Design or plan experiments, investigations, or simulations	○	○	○	○
PTBP19E	e) Conduct experiments, investigations, or simulations	○	○	○	○
PTBP19F	f) Present data from experiments, investigations, or simulations	○	○	○	○
PTBP19G	g) Interpret data from experiments, investigations, or simulations	○	○	○	○
PTBP19H	h) Use evidence from experiments, investigations, or simulations to support conclusions	○	○	○	○
PTBP19I	i) Read their textbooks or other resource materials	○	○	○	○
PTBP19J	j) Have students memorize facts and principles	○	○	○	○
PTBP19K	k) Use scientific formulas and laws to solve routine problems	○	○	○	○
PTBP19L	l) Do field work outside of class	○	○	○	○
PTBP19M	m) Take a written test or quiz	○	○	○	○

Resources for Teaching Physics to the TIMSS class

20

PTBP20A **A. Do the students in this class have computers, tablets, calculators, or smartphones available to use during their physics lessons?**

*Check **one** circle only.*

Yes --- ◯

No --- ◯ → **(If No, go to #21)**

If Yes,

B. How often do you have the students do the following activities on computers, tablets, calculators, or smartphones during physics lessons?

*Check **one** circle for each line.*

		Every or almost every day	Once or twice a week	Once or twice a month	Never or almost never
PTBP20BA	a) Read the textbook or course materials in digital format	◯	◯	◯	◯
PTBP20BB	b) Look up ideas and information	◯	◯	◯	◯
PTBP20BC	c) Process and analyze data	◯	◯	◯	◯
PTBP20BD	d) Draw graphs of functions	◯	◯	◯	◯
PTBP20BE	e) Solve equations	◯	◯	◯	◯
PTBP20BF	f) Manipulate algebraic expressions	◯	◯	◯	◯
PTBP20BG	g) Conduct modeling and simulations	◯	◯	◯	◯
PTBP20BH	h) Perform numerical integration	◯	◯	◯	◯
PTBP20BI	i) Do scientific procedures or experiments	◯	◯	◯	◯

21

PTBP21A **A. Does your school have a physics laboratory?**

*Check **one** circle only.*

Yes --- ◯

No --- ◯

PTPB21B **B. Do teachers usually have assistance available when students are conducting physics experiments?**

*Check **one** circle only.*

Yes --- ◯

No --- ◯

Physics Topics Taught to the TIMSS class

22

The following list includes the main topics addressed by the TIMSS Advanced physics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic was taught half this year but not yet completed, please choose "Mostly taught this year." If a topic is not in the curriculum, please choose "Not yet taught or just introduced."

*Check **one** circle for each line.*

		Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
	A. Mechanics and Thermodynamics			
PTBP22AA	a) Applying Newton's laws and laws of motion	○	○	○
PTBP22AB	b) Forces, including frictional force, acting on a body	○	○	○
PTBP22AC	c) Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time	○	○	○
PTBP22AD	d) The law of gravitation in relation to the movement of celestial objects	○	○	○
PTBP22AE	e) Kinetic and potential energy; conservation of mechanical energy	○	○	○
PTBP22AF	f) The law of conservation of momentum; elastic and inelastic collisions	○	○	○
PTBP22AG	g) The first law of thermodynamics	○	○	○
PTBP22AH	h) Heat transfer and specific heat capacities	○	○	○
PTBP22AI	i) The law of ideal gases; expansion of solids and liquids in relation to temperature change	○	○	○
	B. Electricity and Magnetism			
PTBP22BA	a) Electrostatic attraction or repulsion between isolated charged particles – Coulomb's law	○	○	○
PTBP22BB	b) Charged particles in an electric field	○	○	○
PTBP22BC	c) Electrical circuits; using Ohm's law and Joule's law	○	○	○
PTBP22BD	d) Charged particles in a magnetic field	○	○	○
PTBP22BE	e) Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction	○	○	○
PTBP22BF	f) Faraday's and Lenz's laws of induction	○	○	○
	C. Wave Phenomena and Atomic/Nuclear Physics			
PTBP22CA	a) Mechanical waves; the relationship between speed, frequency, and wavelength	○	○	○
PTBP22CB	b) Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays)	○	○	○
PTBP22CC	c) Thermal radiation, temperature, and wavelength	○	○	○
PTBP22CD	d) Reflection, refraction, interference, and diffraction	○	○	○
PTBP22CE	e) The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons	○	○	○
PTBP22CF	f) Wave-particle duality and the photoelectric effect; types of nuclear reactions and their role in nature (e.g., in stars) and society; radioactive isotopes	○	○	○
PTBP22CG	g) Mass-energy equivalence in nuclear reactions and particle transformations	○	○	○

Physics Homework for the TIMSS class

23

PTBP23A **A. Do you assign physics homework to this class?**

*Check **one** circle only.*

Yes ---

No ---

(If No, go to #24)

If Yes,

B. How often do you assign the following kinds of physics homework to this class?

*Check **one** circle for each line.*

	Always or almost always	Sometimes	Never or almost never
PTBP23BA a) Doing problem/question sets			
PTBP23BB b) Reading the textbook			
PTBP23BC c) Memorizing formulas and procedures			
PTBP23BD d) Gathering, analyzing, and reporting data			
PTBP23BE e) Finding one or more applications of the content covered			
PTBP23BF f) Working on projects			

C. How often do you do the following with the physics homework assignments for this class?

*Check **one** circle for each line.*

	Always or almost always	Sometimes	Never or almost never
a) Correct assignments and give feedback to students PTBP23CA			
b) Have students correct their own homework PTBP23CB			
c) Discuss the homework in class PTBP23CC			
d) Monitor whether or not the homework was completed PTBP23CD			
e) Use the homework to contribute towards students' grades or marks PTBP23CE			

Professional Development and Activities

24

In the past two years, have you participated in professional development in any of the following?

*Check **one** circle for each line.*

		Yes	No
PTBP24A	a) Physics content	◯	◯
PTBP24B	b) Physics pedagogy/instruction	◯	◯
PTBP24C	c) Physics curriculum	◯	◯
PTBP24D	d) Integrating information technology into physics	◯	◯
PTBP24E	e) Improving students' critical thinking or inquiry skills	◯	◯
PTBP24F	f) Physics assessment	◯	◯
PTBP24G	g) Addressing individual students' needs	◯	◯

25

PTBP25

In the past two years, how many hours in total have you spent in formal <in-service/professional development> (e.g., workshops, seminars, etc.) for physics?

*Check **one** circle only.*

- None ◯
- Less than 6 hours ◯
- 6–15 hours ◯
- 16–35 hours ◯
- More than 35 hours ◯

26

PTBP26

By the end of this school year, how many years will you have taught physics at the advanced level?

_____ years
Number of years taught physics

27

A. Are you a member of <professional organization for physics teachers>? PTBP27A

*Check **one** circle only.*

- Yes ◯
- No ◯

B. In the past two years, have you regularly participated in activities sponsored by <professional organization for physics teachers>? PTBP27B

*Check **one** circle only.*

- Yes ◯
- No ◯

28

In the past two years, have you taken part in any of the following activities in physics?

*Check **one** circle for each line.*

		Yes	No	
a)	I attended a workshop or conference	◯	◯	PTBP28A
b)	I gave a presentation at a workshop or conference	◯	◯	PTBP28B
c)	I took part in an innovative project for curriculum and instruction	◯	◯	PTBP28C

Thank You

Thank you for the thought, time, and effort you have put into completing this questionnaire.

BOSTON COLLEGE

TIMSS Advanced 2015

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Teacher Questionnaire Physics

International Association for the Evaluation of Educational Achievement

timss.bc.edu

TIMSS Advanced 2015

SECTION 5:
SCHOOL QUESTIONNAIRE – ADVANCED MATHEMATICS & PHYSICS

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.5: Index of International Background Variables for the TIMSS Advanced 2015 School Questionnaire

This table includes all questions in the school questionnaire, completed by principals of both advanced mathematics and physics students. Each question in the school questionnaire corresponds to two variables—one for advanced mathematics (beginning with "M") and another for physics (beginning with "P").

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
ScQ-01	MCBG01 PCBG01	What is the total enrollment of students in your school as of <first day of month TIMSS Advanced testing begins, 2015>?	MC2GTENR PC2GTENR	Modified wording in 2015
ScQ-02	MCBG02 PCBG02	What is the total enrollment of <twelfth grade> students in your school as of <first day of month TIMSS Advanced testing begins, 2015>?	MC2GENRT PC2GENRT	Modified wording in 2015
ScQ-03a	MCBG03A PCBG03A	Approximately what percentage of students in your school have the following backgrounds? Come from economically disadvantaged homes	MC2GSBED PC2GSBED	
ScQ-03b	MCBG03B PCBG03B	Approximately what percentage of students in your school have the following backgrounds? Come from economically affluent homes	MC2GSBEA PC2GSBEA	
ScQ-04	MCBG04 PCBG04	Approximately what percentage of students in your school have <language of test> as their native language?	MC2GNALA PC2GNALA	Modified response options in 2015
ScQ-05A	MCBG05A PCBG05A	How many people live in the city, town, or area where your school is located?	MC2GCOMU PC2GCOMU	Modified response options in 2015
ScQ-05B	MCBG05B PCBG05B	Which best describes the immediate area in which your school is located?		
ScQ-06a	MCBG06A PCBG06A	What percentage of <twelfth grade> students in your school are taking each of the following? <Advanced Mathematics>	MC2GTGAM PC2GTGAM	
ScQ-06b	MCBG06B PCBG06B	What percentage of <twelfth grade> students in your school are taking each of the following? <Physics>	MC2GTGPH PC2GTGPH	
ScQ-07A	MCBG07A PCBG07A	For the <twelfth grade> students in your school: How many days per year is your school open for instruction?		
ScQ-07B	MCBG07B PCBG07B	For the <twelfth grade> students in your school: What is the total instructional time, excluding breaks, in a typical day? (minutes)		
ScQ-07C	MCBG07C PCBG07C	For the <twelfth grade> students in your school: In one calendar week, how many days is the school open for instruction?		
ScQ-08A	MCBG08A PCBG08A	Does your school have a school library?		
ScQ-08Ba	MCBG08BA PCBG08BA	Approximately how many books (print and digital) with different titles does your school library have (exclude magazines and periodicals)? Print		
ScQ-08Bb	MCBG08BB PCBG08BB	Approximately how many books (print and digital) with different titles does your school library have (exclude magazines and periodicals)? Digital		
ScQ-08Ca	MCBG08CA PCBG08CA	Approximately how many titles of magazines and other periodicals (print and digital) does your school library have? Print		
ScQ-08Cb	MCBG08CB PCBG08CB	Approximately how many titles of magazines and other periodicals (print and digital) does your school library have? Digital		
ScQ-09Aa	MCBG09AA PCBG09AA	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Instructional materials (e.g., textbooks)	MC2GSC01 PC2GSC01	Modified wording and response options in 2015
ScQ-09Ab	MCBG09AB PCBG09AB	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Supplies (e.g., papers, pencils, materials)	MC2GSC02 PC2GSC02	Modified wording and response options in 2015
ScQ-09Ac	MCBG09AC PCBG09AC	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: School buildings and grounds	MC2GSC03 PC2GSC03	Modified wording and response options in 2015
ScQ-09Ad	MCBG09AD PCBG09AD	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Heating/cooling and lighting systems	MC2GSC04 PC2GSC04	Modified wording and response options in 2015
ScQ-09Ae	MCBG09AE PCBG09AE	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Instructional space (e.g., classrooms)	MC2GSC05 PC2GSC05	Modified wording and response options in 2015

Exhibit S1.5: Index of International Background Variables for the TIMSS Advanced 2015 School Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
ScQ-09Af	MCBG09AF PCBG09AF	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Technologically competent staff		
ScQ-09Ag	MCBG09AG PCBG09AG	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Audio-visual resources for delivery of instruction (e.g., interactive white boards, digital projectors)		
ScQ-09Ah	MCBG09AH PCBG09AH	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Computer technology for teaching and learning (e.g., computers or tablets for student use)		
ScQ-09Ai	MCBG09AI PCBG09AI	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? General School Resources: Resources for students with disabilities		
ScQ-09Ba	MCBG09BA PCBG09BA	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Advanced Mathematics Instruction: Teachers with a specialization in advanced mathematics		
ScQ-09Bb	MCBG09BB PCBG09BB	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Advanced Mathematics Instruction: Computer software/applications for advanced mathematics instruction	MC2MSC08 PC2MSC08	Modified wording and response options in 2015
ScQ-09Bc	MCBG09BC PCBG09BC	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Advanced Mathematics Instruction: Library resources relevant to advanced mathematics instruction	MC2MSC10 PC2MSC10	Modified wording and response options in 2015
ScQ-09Bd	MCBG09BD PCBG09BD	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Advanced Mathematics Instruction: Calculators for advanced mathematics instruction	MC2MSC09 PC2MSC09	Modified wording and response options in 2015
ScQ-09Ca	MCBG09CA PCBG09CA	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Physics Instruction: Teachers with a specialization in physics		
ScQ-09Cb	MCBG09CB PCBG09CB	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Physics Instruction: Computer software/applications for physics instruction	MC2PSC14 PC2PSC14	Modified wording and response options in 2015
ScQ-09Cc	MCBG09CC PCBG09CC	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Physics Instruction: Library resources relevant to physics instruction	MC2PSC16 PC2PSC16	Modified wording and response options in 2015
ScQ-09Cd	MCBG09CD PCBG09CD	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Physics Instruction: Calculators for physics instruction	MC2PSC15 PC2PSC15	Modified wording and response options in 2015
ScQ-09Ce	MCBG09CE PCBG09CE	How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following? Resources for Physics Instruction: Physics equipment and materials for experiments	MC2PSC12 PC2PSC12	Modified wording and response options in 2015
ScQ-10a	MCBG10A PCBG10A	How much do you agree with these statements about advanced mathematics and physics education within your school? The school encourages students to study advanced mathematics and physics		
ScQ-10b	MCBG10B PCBG10B	How much do you agree with these statements about advanced mathematics and physics education within your school? The school promotes professional development for teachers of advanced mathematics and physics		
ScQ-10c	MCBG10C PCBG10C	How much do you agree with these statements about advanced mathematics and physics education within your school? The school provides students with information about career options in advanced mathematics and physics		

Exhibit S1.5: Index of International Background Variables for the TIMSS Advanced 2015 School Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
ScQ-10d	MCBG10D PCBG10D	How much do you agree with these statements about advanced mathematics and physics education within your school? The school has initiatives to promote student interest in advanced mathematics and physics (e.g., student clubs, competitions)		
ScQ-10e	MCBG10E PCBG10E	How much do you agree with these statements about advanced mathematics and physics education within your school? The school has partnership initiatives with industry/ businesses in advanced mathematics and physics		
ScQ-10f	MCBG10F PCBG10F	How much do you agree with these statements about advanced mathematics and physics education within your school? Advanced mathematics and physics teachers are admired by other teachers in the school		
ScQ-10g	MCBG10G PCBG10G	How much do you agree with these statements about advanced mathematics and physics education within your school? Students at this school respect students who excel in advanced mathematics and physics		
ScQ-11a	MCBG11A PCBG11A	To what degree is each of the following a problem among <twelfth grade> students in your school? Arriving late at school		
ScQ-11b	MCBG11B PCBG11B	To what degree is each of the following a problem among <twelfth grade> students in your school? Absenteeism (i.e., unjustified absences)		
ScQ-11c	MCBG11C PCBG11C	To what degree is each of the following a problem among <twelfth grade> students in your school? Classroom disturbance		
ScQ-11d	MCBG11D PCBG11D	To what degree is each of the following a problem among <twelfth grade> students in your school? Cheating		
ScQ-11e	MCBG11E PCBG11E	To what degree is each of the following a problem among <twelfth grade> students in your school? Profanity		
ScQ-11f	MCBG11F PCBG11F	To what degree is each of the following a problem among <twelfth grade> students in your school? Vandalism		
ScQ-11g	MCBG11G PCBG11G	To what degree is each of the following a problem among <twelfth grade> students in your school? Theft		
ScQ-11h	MCBG11H PCBG11H	To what degree is each of the following a problem among <twelfth grade> students in your school? Intimidation or verbal abuse among students (including texting, emailing, etc.)		
ScQ-11i	MCBG11I PCBG11I	To what degree is each of the following a problem among <twelfth grade> students in your school? Physical injury to other students		
ScQ-11j	MCBG11J PCBG11J	To what degree is each of the following a problem among <twelfth grade> students in your school? Intimidation or verbal abuse of teachers or staff (including texting, emailing, etc.)		
ScQ-11k	MCBG11K PCBG11K	To what degree is each of the following a problem among <twelfth grade> students in your school? Physical injury to teachers or staff		
ScQ-12a	MCBG12A PCBG12A	How difficult was it to fill <twelfth grade> teaching vacancies for this school year for the following subjects? Advanced mathematics		
ScQ-12b	MCBG12B PCBG12B	How difficult was it to fill <twelfth grade> teaching vacancies for this school year for the following subjects? Physics	MC2PVAPH PC2PVAPH	
ScQ-12c	MCBG12C PCBG12C	How difficult was it to fill <twelfth grade> teaching vacancies for this school year for the following subjects? Computer science/information technology	MC2GVACS PC2GVACS	
ScQ-12d	MCBG12D PCBG12D	How difficult was it to fill <twelfth grade> teaching vacancies for this school year for the following subjects? Other		
ScQ-13a	MCBG13A PCBG13A	Does your school currently use any incentives (e.g., pay, housing, signing bonus, smaller classes) to recruit or retain <twelfth grade> teachers in the following fields? Advanced mathematics		
ScQ-13b	MCBG13B PCBG13B	Does your school currently use any incentives (e.g., pay, housing, signing bonus, smaller classes) to recruit or retain <twelfth grade> teachers in the following fields? Physics	MC2GINPH PC2GINPH	

Exhibit S1.5: Index of International Background Variables for the TIMSS Advanced 2015 School Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)	TIMSS Advanced 2008 Variable Name	Notes
ScQ-13c	MCBG13C PCBG13C	Does your school currently use any incentives (e.g., pay, housing, signing bonus, smaller classes) to recruit or retain <twelfth grade> teachers in the following fields? Computer science/information technology		
ScQ-13d	MCBG13D PCBG13D	Does your school currently use any incentives (e.g., pay, housing, signing bonus, smaller classes) to recruit or retain <twelfth grade> teachers in the following fields? Other	MC2GINOT PC2GINOT	
ScQ-14a	MCBG14A PCBG14A	To what degree is each of the following a problem among teachers in your school? Arriving late or leaving early		
ScQ-14b	MCBG14B PCBG14B	To what degree is each of the following a problem among teachers in your school? Absenteeism		
ScQ-15	MCBG15 PCBG15	By the end of this school year, how many years will you have been a principal altogether?		
ScQ-16	MCBG16 PCBG16	By the end of this school year, how many years will you have been a principal at this school?		
ScQ-17	MCBG17 PCBG17	What is the highest level of formal education you have completed?		
ScQ-18a	MCBG18A PCBG18A	Do you hold the following degrees in educational leadership? <Master's or equivalent level—ISCED Level 7>		
ScQ-18b	MCBG18B PCBG18B	Do you hold the following degrees in educational leadership? <Doctor or equivalent level—ISCED Level 8>		

TIMSS Advanced 2015

Identification Label

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

School Questionnaire

<TIMSS National Research Center Name>
<Address>

TIMSS & PIRLS
International Study Center
Lynch School of Education, Boston College

School *Questionnaire*

Your school has agreed to participate in TIMSS Advanced 2015 (Trends in International Mathematics and Science Study), an educational research project sponsored by the International Association for the Evaluation of Educational Achievement (IEA). TIMSS Advanced measures trends in student achievement in advanced mathematics and physics and studies differences in national education systems in order to help improve teaching and learning worldwide.

This questionnaire is addressed to school principals and department heads who are asked to supply information about their schools. Since your school has been selected as part of a nationwide sample, your responses are very important in helping to describe the school system in <country>.

It is important that you answer each question carefully so that the information provided reflects the situation in your school as accurately as possible. Some of the questions will require that you look up school records, so you may wish to arrange for the assistance of another staff member to help provide this information.

Since TIMSS Advanced is an international study and all countries are using the same questionnaire, you may find that some of the questions seem unusual or are not entirely relevant to you or schools in <country>. Nevertheless, it is important that you do your best to answer all of the questions so comparisons can be made across countries in the study.

It is estimated that you will need approximately 30 minutes to complete this questionnaire. We appreciate the time and effort that this takes and thank you for your cooperation and contribution.

When you have completed the questionnaire, please place it in the accompanying envelope and return it to:

<Insert country-specific information here>.

Thank you.

TIMSS ADVANCED 2015

School Enrollment and Characteristics

1

MCBG01, PCBG01

What is the total enrollment of students in your school as of <first day of month TIMSS Advanced testing begins, 2015>?

_____ students

Write in the number.

2

MCBG02, PCBG02

What is the total enrollment of <twelfth grade> students in your school as of <first day of month TIMSS Advanced testing begins, 2015>?

_____ students

Write in the number.

3

Approximately what percentage of students in your school have the following backgrounds?

*Check **one** circle for each line.*

	0 to 10%	11 to 25%	26 to 50%	More than 50%
MCBG03A, PCBG03A a) Come from economically disadvantaged homes	○	○	○	○
MCBG03B, PCBG03B b) Come from economically affluent homes	○	○	○	○

4

MCBG04, PCBG04

Approximately what percentage of students in your school have <language of test> as their native language?

*Check **one** circle only.*

- More than 90% ○
- 76 to 90% ○
- 51 to 75% ○
- 26 to 50% ○
- 25% or less ○

5

A. How many people live in the city, town, or area where your school is located? MCBG05A, PCBG05A

*Check **one** circle only.*

- More than 500,000 people ○
- 100,001 to 500,000 people ○
- 50,001 to 100,000 people ○
- 30,001 to 50,000 people ○
- 15,001 to 30,000 people ○
- 3,001 to 15,000 people ○
- 3,000 people or fewer ○

B. Which best describes the immediate area in which your school is located? MCBG05B, PCBG05B

*Check **one** circle only.*

- Urban–Densely populated ○
- Suburban–On fringe or outskirts of urban area ○
- Medium size city or large town ○
- Small town or village ○
- Remote rural ○

6

What percentage of <twelfth grade> students in your school are taking each of the following?

Write in the percent.

a) <Advanced Mathematics> ---_____% MCBG06A, PCBG06A

b) <Physics> ----------_____% MCBG06B, PCBG06B

Instructional Time

7

For the <twelfth grade> students in your school:

MCBG07A, PCBG07A

A. How many days per year is your school open for instruction?

_____ days
Write in the number.

MCBG07B, PCBG07B

B. What is the total instructional time, excluding breaks, in a typical day?

_____ minutes
Write in the number of minutes per day.
Please convert the number of hours into minutes.

MCBG07C, PCBG07C

C. In one calendar week, how many days is the school open for instruction?

*Check **one** circle only.*

- 6 days ◯
- 5 1/2 days ◯
- 5 days ◯
- 4 1/2 days ◯
- 4 days ◯
- Other ◯

Resources and Technology

8

A. Does your school have a school library? MCBG08A, PCBG08A

*Check **one** circle only.*

- Yes ◯
- No ◯ → **(If No, go to #9)**

If Yes,

B. Approximately how many books (print and digital) with different titles does your school library have (exclude magazines and periodicals)?

*Check **one** circle in each column.*

MCBG08BA, PCBG08BA
MCBG08BB, PCBG08BB

	Print	Digital
250 or fewer	◯	◯
251–500	◯	◯
501–2,000	◯	◯
2,001–5,000	◯	◯
5,001–10,000	◯	◯
More than 10,000	◯	◯

C. Approximately how many titles of magazines and other periodicals (print and digital) does your school library have?

*Check **one** circle in each column.*

MCBG08CA, PCBG08CA
MCBG08CB, PCBG08CB

	Print	Digital
0	◯	◯
1–5	◯	◯
6–10	◯	◯
11–30	◯	◯
31 or more	◯	◯

9

How much is your school's capacity to provide instruction affected by a shortage or inadequacy of the following?

*Check **one** circle for each line.*

	Not at all	A little	Some	A lot
A. General School Resources				
MCBG09AA, PCBG09AA — a) Instructional materials (e.g., textbooks)	○	○	○	○
MCBG09AB, PCBG09AB — b) Supplies (e.g., papers, pencils, materials)	○	○	○	○
MCBG09AC, PCBG09AC — c) School buildings and grounds	○	○	○	○
MCBG09AD, PCBG09AD — d) Heating/cooling and lighting systems	○	○	○	○
MCBG09AE, PCBG09AE — e) Instructional space (e.g., classrooms)	○	○	○	○
MCBG09AF, PCBG09AF — f) Technologically competent staff	○	○	○	○
MCBG09AG, PCBG09AG — g) Audio-visual resources for delivery of instruction (e.g., interactive white boards, digital projectors)	○	○	○	○
MCBG09AH, PCBG09AH — h) Computer technology for teaching and learning (e.g., computers or tablets for student use)	○	○	○	○
MCBG09AI, PCBG09AI — i) Resources for students with disabilities	○	○	○	○

*Check **one** circle for each line.*

	Not at all	A little	Some	A lot
B. Resources for Advanced Mathematics Instruction				
a) Teachers with a specialization in advanced mathematics — MCBG09BA, PCBG09BA	○	○	○	○
b) Computer software/ applications for advanced mathematics instruction — MCBG09BB, PCBG09BB	○	○	○	○
c) Library resources relevant to advanced mathematics instruction — MCBG09BC, PCBG09BC	○	○	○	○
d) Calculators for advanced mathematics instruction — MCBG09BD, PCBG09BD	○	○	○	○
C. Resources for Physics Instruction				
a) Teachers with a specialization in physics — MCBG09CA, PCBG09CA	○	○	○	○
b) Computer software/ applications for physics instruction — MCBG09CB, PCBG09CB	○	○	○	○
c) Library resources relevant to physics instruction — MCBG09CC, PCBG09CC	○	○	○	○
d) Calculators for physics instruction — MCBG09CD, PCBG09CD	○	○	○	○
e) Physics equipment and materials for experiments — MCBG09CE, PCBG09CE	○	○	○	○

School Emphasis on Advanced Mathematics and Physics Education

10 How much do you agree with these statements about advanced mathematics and physics education within your school?

*Check **one** circle for each line.*

		Agree a lot	Agree a little	Disagree a little	Disagree a lot
MCBG10A, PCBG10A	a) The school encourages students to study advanced mathematics and physics	○	○	○	○
MCBG10B, PCBG10B	b) The school promotes professional development for teachers of advanced mathematics and physics	○	○	○	○
MCBG10C, PCBG10C	c) The school provides students with information about career options in advanced mathematics and physics	○	○	○	○
MCBG10D, PCBG10D	d) The school has initiatives to promote student interest in advanced mathematics and physics (e.g., student clubs, competitions)	○	○	○	○
MCBG10E, PCBG10E	e) The school has partnership initiatives with industry/ businesses in advanced mathematics and physics	○	○	○	○
MCBG10F, PCBG10F	f) Advanced mathematics and physics teachers are admired by other teachers in the school	○	○	○	○
MCBG10G, PCBG10G	g) Students at this school respect students who excel in advanced mathematics and physics	○	○	○	○

School Discipline and Safety

11 To what degree is each of the following a problem among <twelfth grade> students in your school?

*Check **one** circle for each line.*

		Not a problem	Minor problem	Moderate problem	Serious problem
MCBG11A, PCBG11A	a) Arriving late at school	○	○	○	○
MCBG11B, PCBG11B	b) Absenteeism (i.e., unjustified absences)	○	○	○	○
MCBG11C, PCBG11C	c) Classroom disturbance	○	○	○	○
MCBG11D, PCBG11D	d) Cheating	○	○	○	○
MCBG11E, PCBG11E	e) Profanity	○	○	○	○
MCBG11F, PCBG11F	f) Vandalism	○	○	○	○
MCBG11G, PCBG11G	g) Theft	○	○	○	○
MCBG11H, PCBG11H	h) Intimidation or verbal abuse among students (including texting, emailing, etc.)	○	○	○	○
MCBG11I, PCBG11I	i) Physical injury to other students	○	○	○	○
MCBG11J, PCBG11J	j) Intimidation or verbal abuse of teachers or staff (including texting, emailing, etc.)	○	○	○	○
MCBG11K, PCBG11K	k) Physical injury to teachers or staff	○	○	○	○

Teachers in Your School

12

How difficult was it to fill <twelfth grade> teaching vacancies for this school year for the following subjects?

*Check **one** circle for each line.*

	Were no vacancies in this subject	Easy to fill vacancies	Somewhat difficult	Very difficult
MCBG12A, PCBG12A a) Advanced mathematics	○	○	○	○
MCBG12B, PCBG12B b) Physics	○	○	○	○
MCBG12C, PCBG12C c) Computer science/ information technology	○	○	○	○
MCBG12D, PCBG12D d) Other	○	○	○	○

13

Does your school currently use any incentives (e.g., pay, housing, signing bonus, smaller classes) to recruit or retain <twelfth grade> teachers in the following fields?

*Check **one** circle for each line.*

	Yes	No
MCBG13A, PCBG13A a) Advanced mathematics	○	○
MCBG13B, PCBG13B b) Physics	○	○
MCBG13C, PCBG13C c) Computer science/information technology	○	○
MCBG13D, PCBG13D d) Other	○	○

14

To what degree is each of the following a problem among teachers in your school?

*Check **one** circle for each line.*

	Not a problem	Minor problem	Moderate problem	Serious problem
MCBG14A, PCBG14A a) Arriving late or leaving early	○	○	○	○
MCBG14B, PCBG14B b) Absenteeism	○	○	○	○

Principal Experience and Education

15

By the end of this school year, how many years will you have been a principal altogether? MCBG15, PCBG15

_____ years

*Please **round** to the nearest whole number.*

16

By the end of this school year, how many years will you have been a principal at this school? MCBG16, PCBG16

_____ years

*Please **round** to the nearest whole number.*

17

What is the highest level of formal education you have completed? MCBG17, PCBG17

*Check **one** circle only.*

- Did not complete <Bachelor's or equivalent level—ISCED Level 6> ○
- <Bachelor's or equivalent level—ISCED Level 6> ○
- <Master's or equivalent level—ISCED Level 7> ○
- <Doctor or equivalent level—ISCED Level 8> ○

18

Do you hold the following degrees in educational leadership?

*Check **one** circle for each line.*

	Yes	No	
a) <Master's or equivalent level—ISCED Level 7>	○	○	MCBG18A, PCBG18A
b) <Doctor or equivalent level—ISCED Level 8>--	○	○	MCBG18B, PCBG18B

Thank You

Thank you for the thought, time, and effort you have put into completing this questionnaire.

BOSTON COLLEGE

TIMSS Advanced 2015

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

School Questionnaire

International Association for the Evaluation of Educational Achievement

timss.bc.edu

TIMSS Advanced 2015

SECTION 6: ADVANCED MATHEMATICS CURRICULUM QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.6: Index of International Variables for the TIMSS Advanced 2015 Advanced Mathematics Curriculum Questionnaire

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)
CQMA-01A	MAA01A	Describe the advanced mathematics programs/tracks assessed by TIMSS Advanced 2015. How do the programs/tracks fit into the overall curriculum from the first grade through the final year? How do they relate with programs at the university level, if at all (e.g., is participation a prerequisite for studying certain fields such as engineering or medicine)?
CQMA-01B	MAA01B	How many years are students in these programs/tracks, and at which grade do they start?
CQMA-01C	MAA01C	What is the total amount of class time in advanced mathematics for the students in the advanced mathematics programs/tracks? (hours per year)
CQMA-01CT	MAA01CT	What is the total amount of class time in advanced mathematics for the students in the advanced mathematics programs/tracks? Comments:
CQMA-02A	MAA02A	What are the criteria for admission to these advanced mathematics programs/tracks?
CQMA-02B	MAA02B	Are there any prerequisite courses for students taking these advanced mathematics programs/tracks?
CQMA-02BT	MAA02BT	If Yes…Please explain:
CQMA-03A	MAA03A	Summarize the mathematics curriculum that was in effect for the students assessed in TIMSS Advanced 2015.
CQMA-03B	MAA03B	In what year was the advanced mathematics curriculum introduced?
CQMA-03BT	MAA03BT	In what year was the advanced mathematics curriculum introduced? Comments:
CQMA-03C	MAA03C	Is the advanced mathematics curriculum currently being revised?
CQMA-03CTA	MAA03CTA	If Yes…Please explain:
CQMA-03CTB	MAA03CTB	If No…Comments:
CQMA-04	MAA04	Is there a process for approving the advanced mathematics instructional materials?
CQMA-04T	MAA04T	If Yes...Please describe the process, and what materials (e.g., textbooks, workbooks, online materials) must be approved through this process:
CQMA-05A	MAA05A	Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in advanced mathematics instruction?
CQMA-05ATA	MAA05ATA	If Yes...What are the statements/policies?
CQMA-05ATB	MAA05ATB	Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in advanced mathematics instruction? Comments:
CQMA-05B	MAA05B	Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in advanced mathematics tests or examinations?
CQMA-05BTA	MAA05BTA	If Yes...What are the statements/policies?
CQMA-05BTB	MAA05BTB	Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in advanced mathematics tests or examinations? Comments:
CQMA-06A	MAA06A	Does an educational authority in your country (e.g., National Ministry of Education) administer examinations to students in these advanced mathematics programs/tracks that have consequences for individual students, such as entry to a university?
CQMA-06B	MAA06B	If Yes...Please describe the secondary school grades at which the exams are given to students in each of these programs/tracks and the purpose of each exam.
CQMA-06C	MAA06C	What is the nature and format of the examinations, and do they have an oral component?
CQMA-06D	MAA06D	Additional comments on the examination system
CQMA-07Aa	MAA07AA	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Operations with exponential, logarithmic, polynomial, rational, and radical expressions
CQMA-07Ab	MAA07AB	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Operations with complex numbers
CQMA-07Ac	MAA07AC	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Evaluating algebraic expressions (e.g., exponential, logarithmic, polynomial, rational, and radical)

Exhibit S1.6: Index of International Variables for the TIMSS Advanced 2015 Advanced Mathematics Curriculum Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)
CQMA-07Ad	MAA07AD	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: The nth term of arithmetic and geometric sequences and the sums of finite and infinite series
CQMA-07Ae	MAA07AE	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Linear, simultaneous, and quadratic equations and inequalities; radical equations, logarithmic, and exponential equations
CQMA-07Af	MAA07AF	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Slopes, y-axis intercepts, and points of intersection of straight lines
CQMA-07Ag	MAA07AG	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Equivalent representations of functions, including composite functions as ordered pairs, tables, graphs, formulas, or words
CQMA-07Ah	MAA07AH	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra: Properties of functions including domain and range
CQMA-07AT	MAA07AT	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Algebra topics: Comments:
CQMA-07Ba	MAA07BA	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Limits of functions
CQMA-07Bb	MAA07BB	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Conditions for continuity and differentiability of functions
CQMA-07Bc	MAA07BC	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Differentiation of functions (including polynomial, exponential, logarithmic, trigonometric, rational, and radical functions); differentiation of products, quotients, and composite functions
CQMA-07Bd	MAA07BD	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Using derivatives to solve problems (e.g., in optimization and rates of change)
CQMA-07Be	MAA07BE	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Using first and second derivatives to determine slope and local extrema of functions
CQMA-07Bf	MAA07BF	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Using derivatives to determine points of inflection of functions
CQMA-07Bg	MAA07BG	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus: Integrating functions (including polynomial, exponential, trigonometric, and rational functions); evaluating definite integrals, including calculation of areas
CQMA-07BT	MAA07BT	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Calculus topics: Comments:

Exhibit S1.6: Index of International Variables for the TIMSS Advanced 2015 Advanced Mathematics Curriculum Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)
CQMA-07Ca	MAA07CA	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Geometry: Properties of geometric figures in two and three dimensions
CQMA-07Cb	MAA07CB	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Geometry: Properties of vectors and their sums and differences
CQMA-07Cc	MAA07CC	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Geometry: Trigonometric properties of triangles (sine, cosine, and tangent)
CQMA-07Cd	MAA07CD	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Geometry topics: Trigonometric functions and their graphs
CQMA-07CT	MAA07CT	According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Geometry topics: Comments:
CQMA-08a	MAA08A	How is the implementation of the advanced mathematics curriculum evaluated? Visits by inspectors
CQMA-08b	MAA08B	How is the implementation of the advanced mathematics curriculum evaluated? Research programs
CQMA-08c	MAA08C	How is the implementation of the advanced mathematics curriculum evaluated? School self-evaluation
CQMA-08d	MAA08D	How is the implementation of the advanced mathematics curriculum evaluated? National or regional examinations
CQMA-08e	MAA08E	How is the implementation of the advanced mathematics curriculum evaluated? Other
CQMA-08eT	MAA08ET	How is the implementation of the advanced mathematics curriculum evaluated? Other, please specify below:
CQMA-08T	MAA08T	How is the implementation of the advanced mathematics curriculum evaluated? Comments
CQMA-09A	MAA09A	Does your country sponsor national programs to encourage students to study advanced mathematics?
CQMA-09Ba	MAA09BA	If Yes...Does your country implement any of the following programs to promote the study of advanced mathematics? School partnerships with industry
CQMA-09Bb	MAA09BB	If Yes...Does your country implement any of the following programs to promote the study of advanced mathematics? School collaborations with universities
CQMA-09Bc	MAA09BC	If Yes...Does your country implement any of the following programs to promote the study of advanced mathematics? Contests/competitions in advanced mathematics
CQMA-09Bd	MAA09BD	If Yes...Does your country implement any of the following programs to promote the study of advanced mathematics? Other
CQMA-09BdT	MAA09BDT	If Yes...Does your country implement any of the following programs to promote the study of advanced mathematics? Other, please specify:
CQMA-09BT	MAA09BT	If Yes...Does your country implement any of the following programs to promote the study of advanced mathematics? If applicable, please describe the programs implemented in your country to promote the study of advanced mathematics:
CQMA-10	MAA10	Describe the national requirements for being a teacher of the advanced mathematics programs/tracks being assessed in TIMSS Advanced.
CQMA-11	MAA11	Does your country experience any difficulties recruiting or retaining advanced mathematics teachers of students at the end of upper secondary school?
CQMA-11T	MAA11T	If Yes…Comments:

TIMSS Advanced 2015

TIMSS Advanced 2015 Curriculum Questionnaire—Mathematics

Advanced Mathematics

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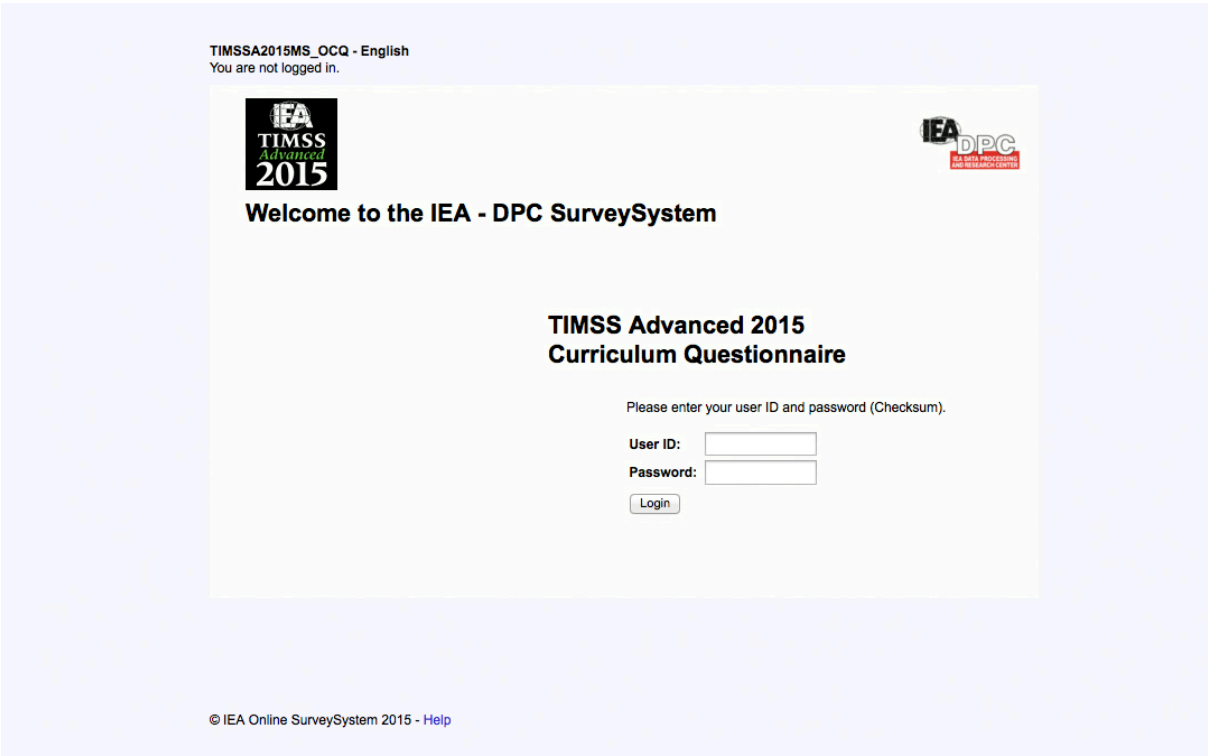
TIMSSA2015MS_OCQ - English
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Welcome to the IEA - DPC SurveySystem
TIMSS Advanced 2015
Curriculum Questionnaire
Please enter your user ID and password (Checksum).
User ID:
Password:
Login
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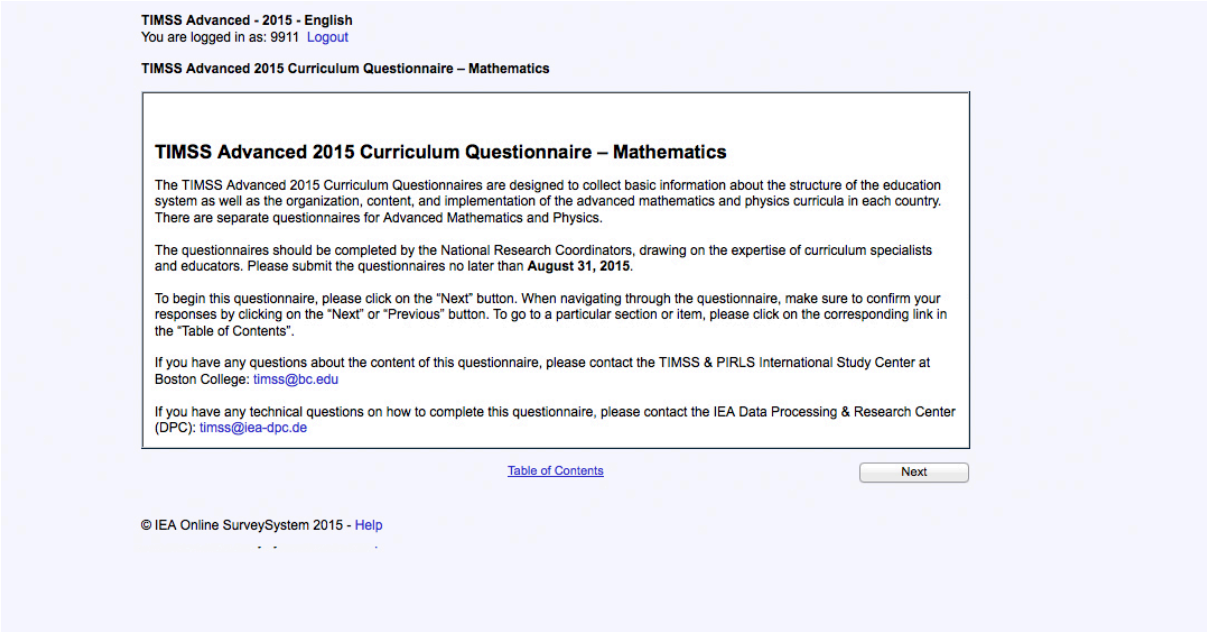
TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics
TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics
The TIMSS Advanced 2015 Curriculum Questionnaires are designed to collect basic information about the structure of the education system as well as the organization, content, and implementation of the advanced mathematics and physics curricula in each country. There are separate questionnaires for Advanced Mathematics and Physics.
The questionnaires should be completed by the National Research Coordinators, drawing on the expertise of curriculum specialists and educators. Please submit the questionnaires no later than August 31, 2015.
To begin this questionnaire, please click on the "Next" button. When navigating through the questionnaire, make sure to confirm your responses by clicking on the "Next" or "Previous" button. To go to a particular section or item, please click on the corresponding link in the "Table of Contents".
If you have any questions about the content of this questionnaire, please contact the TIMSS & PIRLS International Study Center at Boston College: timss@bc.edu
If you have any technical questions on how to complete this questionnaire, please contact the IEA Data Processing & Research Center (DPC): timss@iea-dpc.de
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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - About the Advanced Mathematics Programs (Tracks)

About the Advanced Mathematics Programs (Tracks)

This questionnaire refers to the national advanced mathematics curriculum that was in effect for the students assessed in TIMSS Advanced 2015—the curriculum that covers advanced mathematics instruction for the majority of students in these programs or tracks. If you do not have a national curriculum, please summarize for your state or provincial curricula.

MAA01A

1. A. Describe the advanced mathematics programs/tracks assessed by TIMSS Advanced 2015. How do the programs/tracks fit into the overall curriculum from the first grade through the final year? How do they relate with programs at the university level, if at all (e.g., is participation a prerequisite for studying certain fields such as engineering or medicine)?

Examples of information reported for TIMSS Advanced 2008 can be found in the second column of Exhibit 1.1 on pages 26-27 of the 2008 report. Click here to view

MAA01B

B. How many years are students in these programs/tracks, and at which grade do they start?

Examples of information reported for TIMSS Advanced 2008 can be found in the third column of Exhibit 1.1 on pages 26-27 of the 2008 report. Click here to view

MAA01C

C. What is the total amount of class time in advanced mathematics for the students in the advanced mathematics programs/tracks?

Examples of information reported for TIMSS Advanced 2008 can be found in the fourth column of Exhibit 1.1 on pages 26-27 of the 2008 report. Click here to view

hours per year (1 hour = 60 minutes)

MAA01CT

Comments:

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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Criteria for Admission

Criteria for Admission

MAA02A

2. A. What are the criteria for admission to these advanced mathematics programs/tracks?

Examples of information reported for TIMSS Advanced 2008 can be found in the fifth column of Exhibit 1.1 on pages 26-27 of the 2008 report. Click here to view

MAA02B

B. Are there any prerequisite courses for students taking these advanced mathematics programs/tracks?

*Check **one** circle only.*

- ○ Yes
- ○ No

MAA02BT

If Yes…
Please explain:

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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Curriculum

Advanced Mathematics Curriculum

MAA03A

3. A. Summarize the mathematics curriculum that was in effect for the students assessed in TIMSS Advanced 2015. (750 words)

If applicable, please reference your country's curricular documents.

MAA03B

B. In what year was the advanced mathematics curriculum introduced?

Examples of information reported for TIMSS Advanced 2008 can be found in the second column of Exhibit 1.3 on page 33 of the 2008 report. Click here to view

MAA03BT

Comments:

(Continued on Next Page)

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TIMSS Advanced - 2015 - English *(Continued)*
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Curriculum

MAA03C

C. Is the advanced mathematics curriculum currently being revised?

Examples of information reported for TIMSS Advanced 2008 can be found in the third column of Exhibit 1.3 on page 33 of the 2008 report. Click here to view

*Check **one** circle only.*

- Yes
- No

MAA03CTA

If Yes...
Please explain:

MAA03CTB

If No...
Comments:

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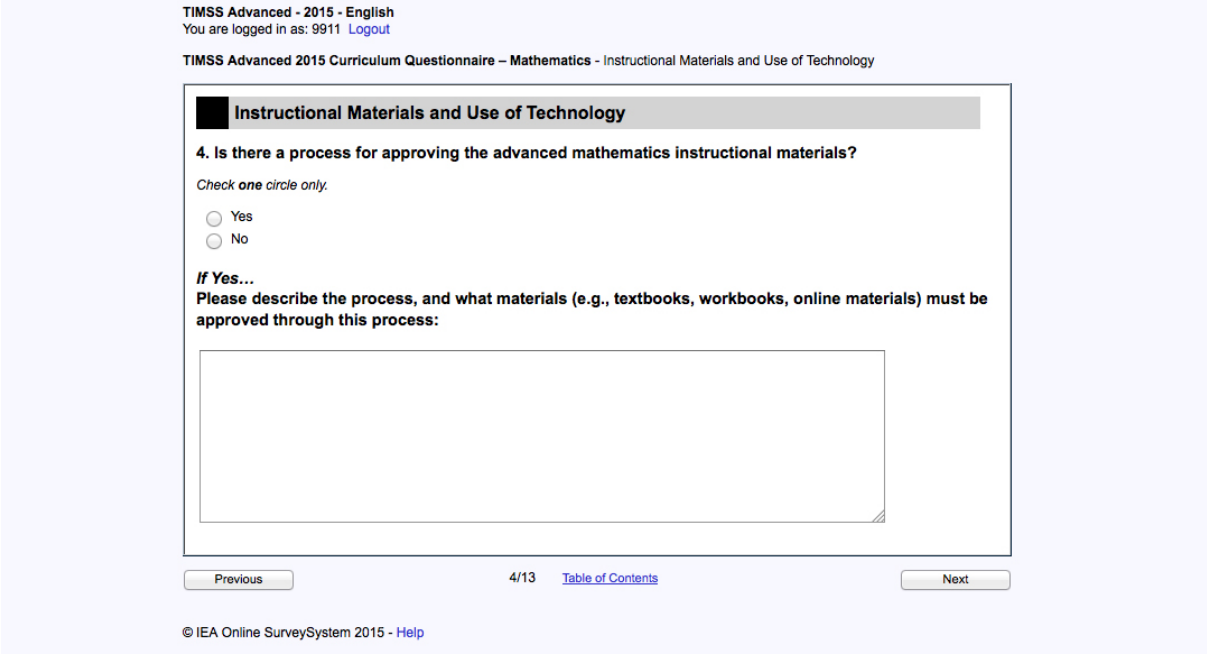
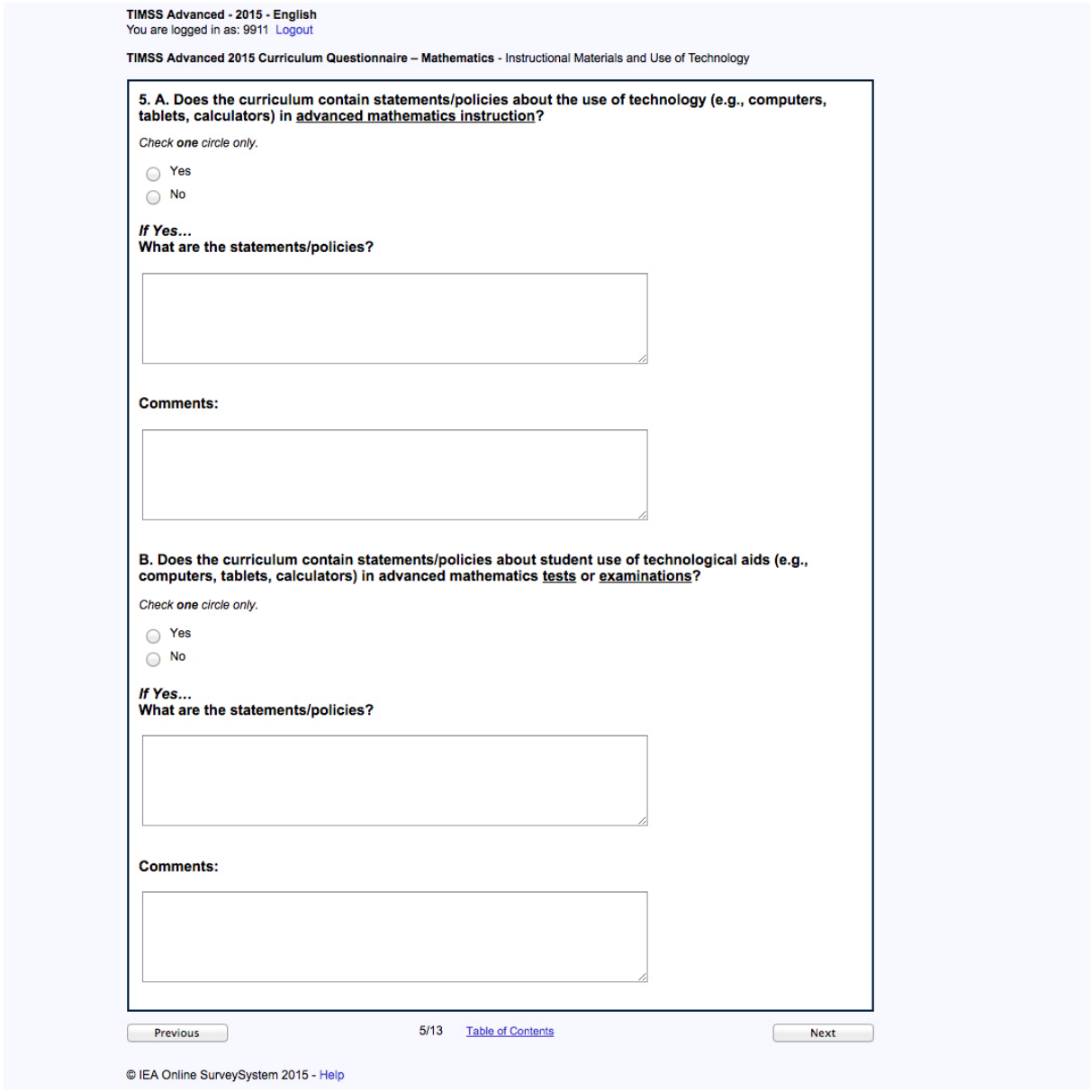
MAA04

MAA04T





TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Instructional Materials and Use of Technology

MAA05A

5. A. Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in advanced mathematics instruction?

*Check **one** circle only.*

- ○ Yes
- ○ No

MAA05ATA

If Yes…
What are the statements/policies?

MAA05ATB

Comments:

MAA05B

B. Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in advanced mathematics tests or examinations?

*Check **one** circle only.*

- ○ Yes
- ○ No

MAA05BTA

If Yes…
What are the statements/policies?

MAA05BTB

Comments:

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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Examinations

Examinations

MAA06A

6. A. Does an educational authority in your country (e.g., National Ministry of Education) administer examinations to students in these advanced mathematics programs/tracks that have consequences for individual students, such as entry to a university?

*Check **one** circle only.*

- ○ Yes
- ○ No

MAA06B

If Yes....
B. Please describe the secondary school grades at which the exams are given to students in each of these programs/tracks and the purpose of each exam.

Examples of information reported for TIMSS Advanced 2008 can be found in the third and fifth columns of Exhibit 1.6 on pages 38-39 of the 2008 report. Click here to view

MAA06C

C. What is the nature and format of the examinations, and do they have an oral component?

Examples of information reported for TIMSS Advanced 2008 can be found in the fourth column of Exhibit 1.6 on pages 38-39 of the 2008 report. Click here to view

MAA06D

D. Additional comments on the examination system

Examples of information reported for TIMSS Advanced 2008 can be found in the sixth column of Exhibit 1.6 on pages 38-39 of the 2008 report. Click here to view

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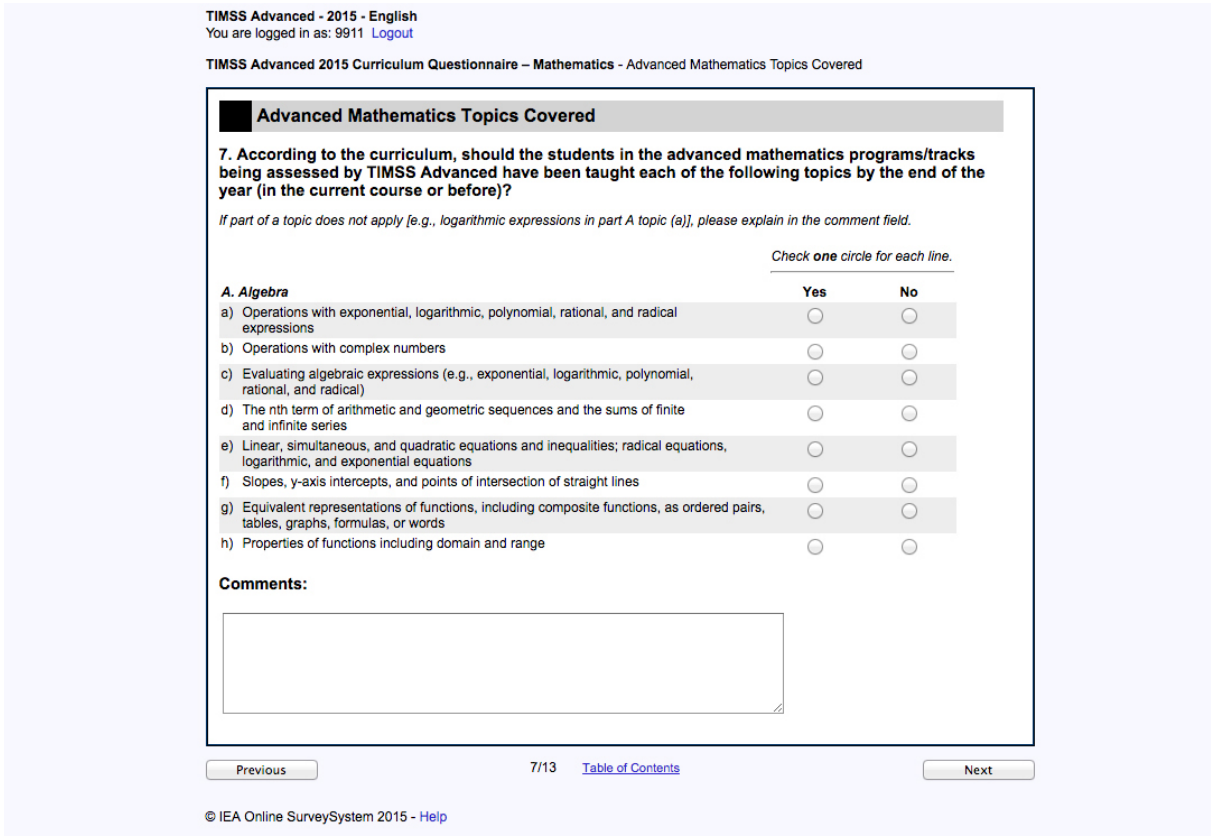

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Topics Covered

Advanced Mathematics Topics Covered

7. According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., logarithmic expressions in part A topic (a)], please explain in the comment field.

*Check **one** circle for each line.*

		Yes	No
	A. Algebra		
MAA07AA	a) Operations with exponential, logarithmic, polynomial, rational, and radical expressions	○	○
MAA07AB	b) Operations with complex numbers	○	○
MAA07AC	c) Evaluating algebraic expressions (e.g., exponential, logarithmic, polynomial, rational, and radical)	○	○
MAA07AD	d) The nth term of arithmetic and geometric sequences and the sums of finite and infinite series	○	○
MAA07AE	e) Linear, simultaneous, and quadratic equations and inequalities; radical equations, logarithmic, and exponential equations	○	○
MAA07AF	f) Slopes, y-axis intercepts, and points of intersection of straight lines	○	○
MAA07AG	g) Equivalent representations of functions, including composite functions, as ordered pairs, tables, graphs, formulas, or words	○	○
MAA07AH	h) Properties of functions including domain and range	○	○

Comments:

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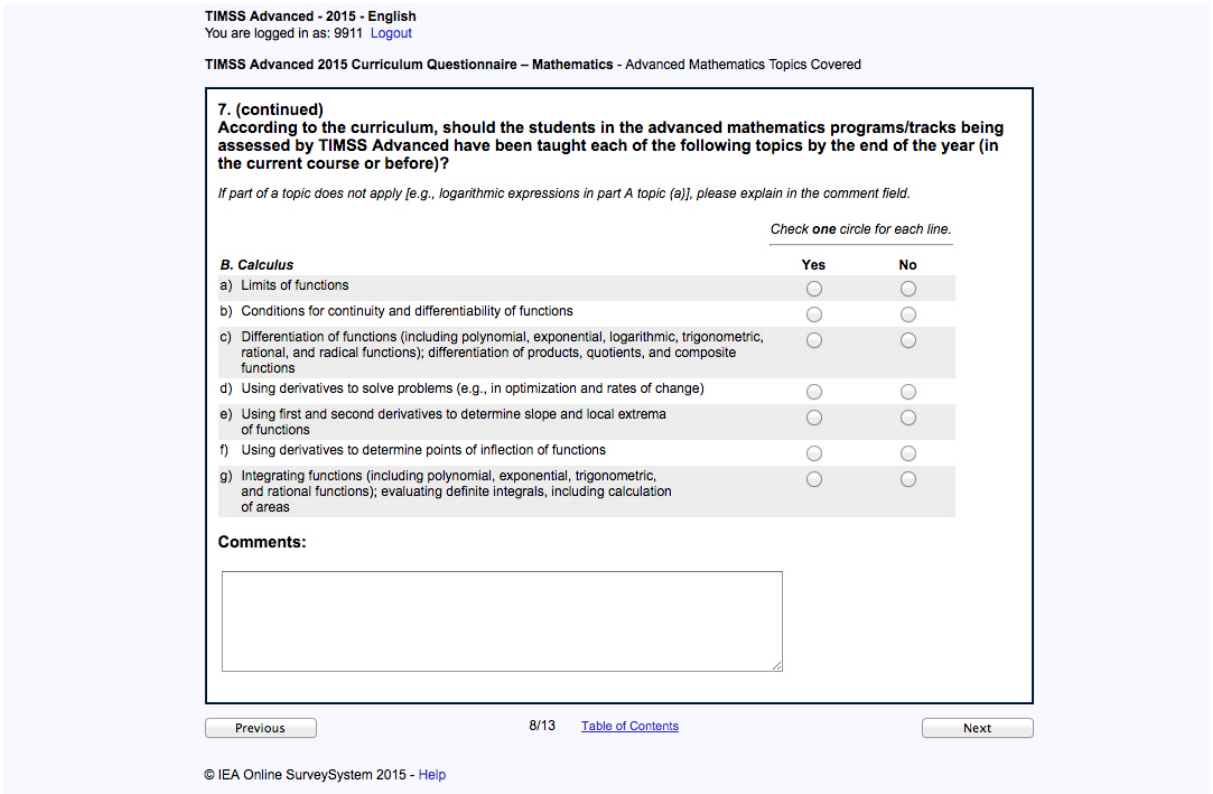

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Topics Covered

7. (continued)
According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., logarithmic expressions in part A topic (a)], please explain in the comment field.

*Check **one** circle for each line.*

	B. Calculus	**Yes**	**No**
MAA07BA	a) Limits of functions	○	○
MAA07BB	b) Conditions for continuity and differentiability of functions	○	○
MAA07BC	c) Differentiation of functions (including polynomial, exponential, logarithmic, trigonometric, rational, and radical functions); differentiation of products, quotients, and composite functions	○	○
MAA07BD	d) Using derivatives to solve problems (e.g., in optimization and rates of change)	○	○
MAA07BE	e) Using first and second derivatives to determine slope and local extrema of functions	○	○
MAA07BF	f) Using derivatives to determine points of inflection of functions	○	○
MAA07BG	g) Integrating functions (including polynomial, exponential, trigonometric, and rational functions); evaluating definite integrals, including calculation of areas	○	○

Comments:

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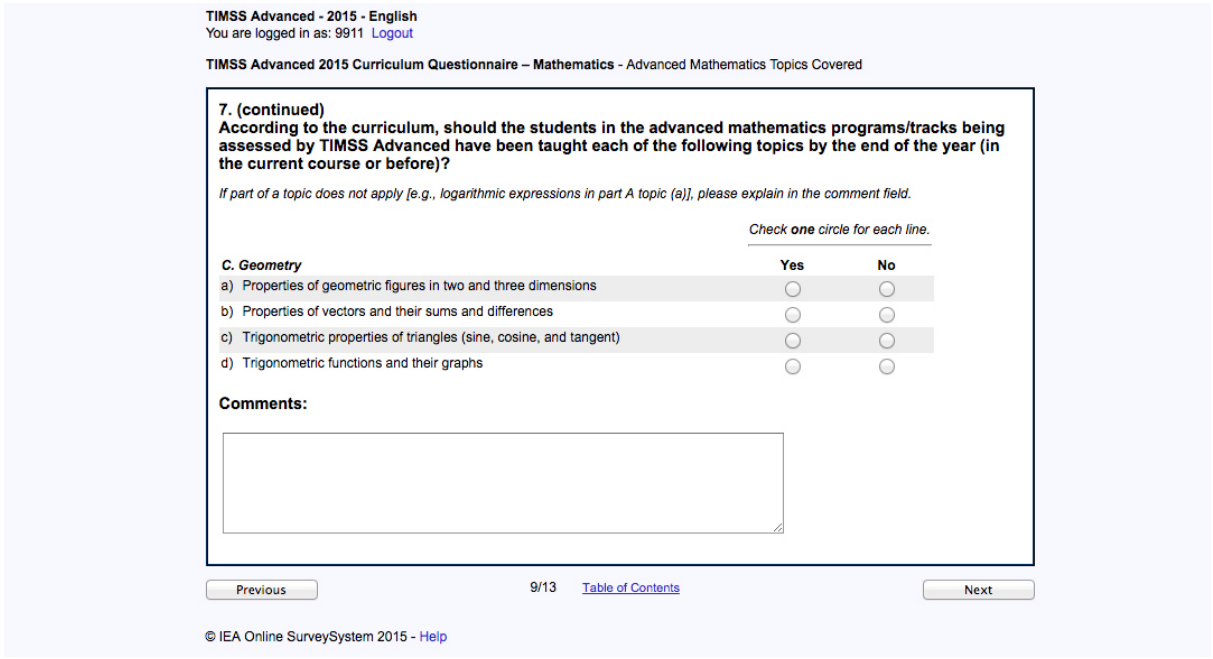

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Topics Covered

7. (continued)
According to the curriculum, should the students in the advanced mathematics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., logarithmic expressions in part A topic (a)], please explain in the comment field.

*Check **one** circle for each line.*

C. Geometry	**Yes**	**No**
a) Properties of geometric figures in two and three dimensions	○	○
b) Properties of vectors and their sums and differences	○	○
c) Trigonometric properties of triangles (sine, cosine, and tangent)	○	○
d) Trigonometric functions and their graphs	○	○

Comments:

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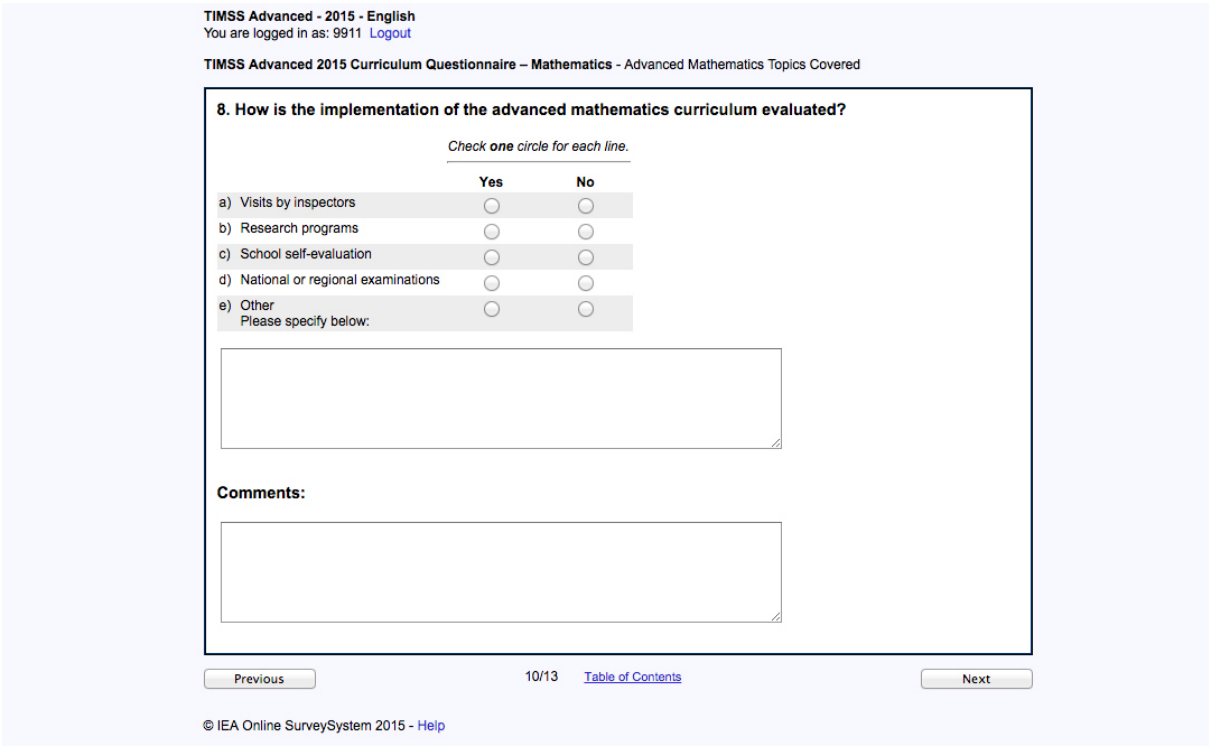
MAA07CA
MAA07CB
MAA07CC
MAA07CD

MAA07CT

MAA08A
MAA08B
MAA08C
MAA08D
MAA08E
MAA08ET

MAA08T



TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Topics Covered

8. How is the implementation of the advanced mathematics curriculum evaluated?

*Check **one** circle for each line.*

	Yes	No
a) Visits by inspectors	○	○
b) Research programs	○	○
c) School self-evaluation	○	○
d) National or regional examinations	○	○
e) Other Please specify below:	○	○

Comments:

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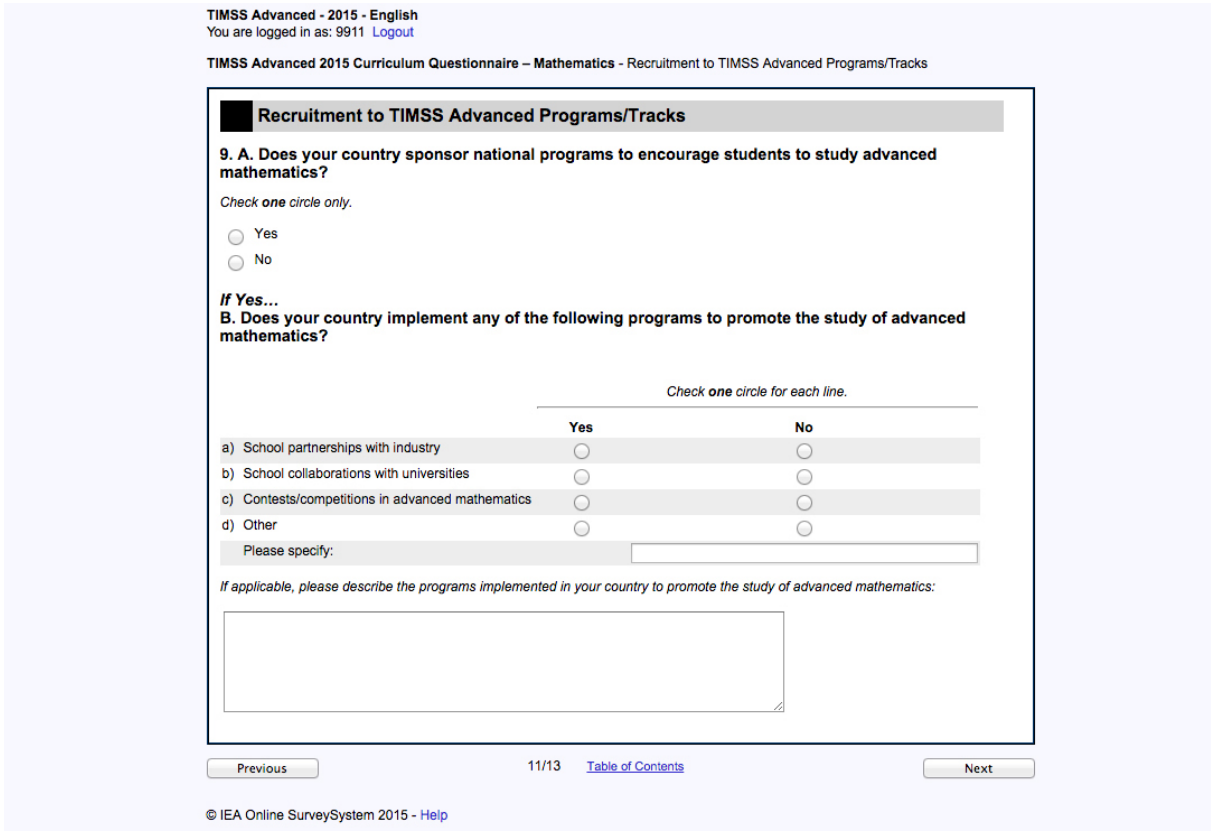

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Recruitment to TIMSS Advanced Programs/Tracks

Recruitment to TIMSS Advanced Programs/Tracks

MAA09A

9. A. Does your country sponsor national programs to encourage students to study advanced mathematics?

*Check **one** circle only.*

- Yes
- No

If Yes…
B. Does your country implement any of the following programs to promote the study of advanced mathematics?

*Check **one** circle for each line.*

	Yes	No
a) School partnerships with industry		
b) School collaborations with universities		
c) Contests/competitions in advanced mathematics		
d) Other		
Please specify:		

MAA09BA
MAA09BB
MAA09BC
MAA09BD
MAA09BDT

If applicable, please describe the programs implemented in your country to promote the study of advanced mathematics:

MAA09BT

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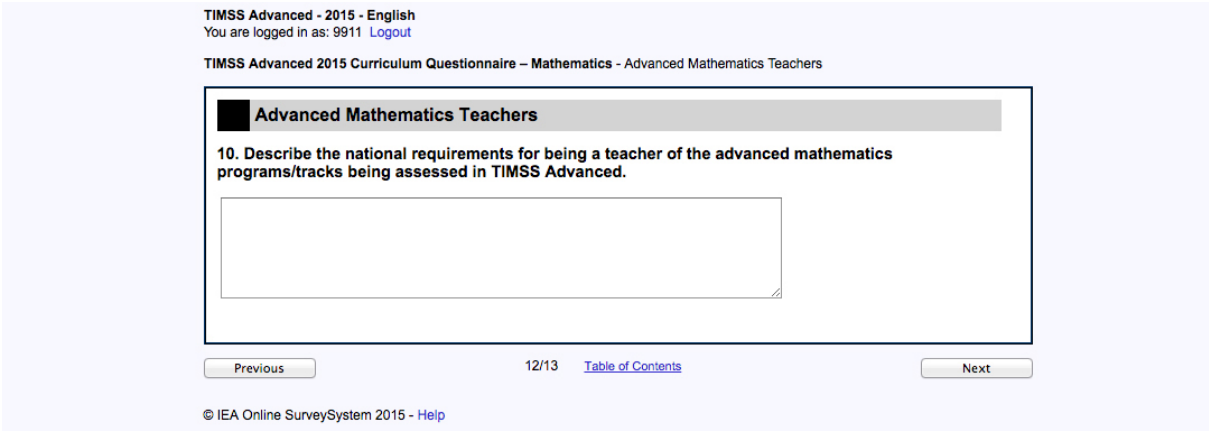
MAA10


TIMSS Advanced - 2015 - English
You are logged in as: 9911 Logout
TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics - Advanced Mathematics Teachers
Advanced Mathematics Teachers
10. Describe the national requirements for being a teacher of the advanced mathematics programs/tracks being assessed in TIMSS Advanced.
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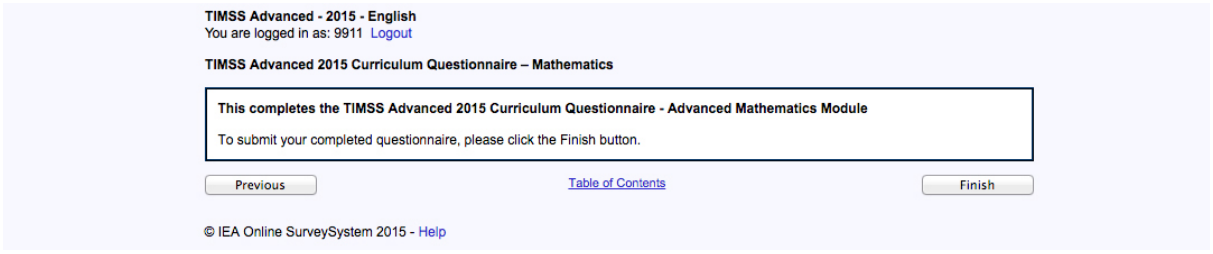
MAA11

MAA11T


TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Mathematics
This completes the TIMSS Advanced 2015 Curriculum Questionnaire - Advanced Mathematics Module
To submit your completed questionnaire, please click the Finish button.
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Finish
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TIMSS Advanced 2015

BOSTON COLLEGE
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Advanced Mathematics

International Association for the Evaluation of Educational Achievement

TIMSS Advanced 2015

SECTION 7: PHYSICS CURRICULUM QUESTIONNAIRE

TIMSS ADVANCED 2015 USER GUIDE
FOR THE INTERNATIONAL DATABASE

IEA
TIMSS & PIRLS International Study Center
Lynch School of Education, Boston College

Exhibit S1.7: Index of International Variables for the TIMSS Advanced 2015 Physics Curriculum Questionnaire

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)
CQPA-01A	PHA01A	Describe the physics programs/tracks assessed by TIMSS Advanced 2015. How do the programs/tracks fit into the overall curriculum from the first grade through the final year? How do they relate with programs at the university level, if at all (e.g., is participation a prerequisite for studying certain fields such as engineering or medicine)?
CQPA-01B	PHA01B	How many years are students in these programs/tracks, and at which grade do they start?
CQPA-01C	PHA01C	What is the total amount of class time in physics for the students in the physics programs/tracks? (hours per year)
CQPA-01CT	PHA01CT	What is the total amount of class time in physics for the students in the physics programs/tracks? Comments:
CQPA-02A	PHA02A	What are the criteria for admission to these physics programs/tracks?
CQPA-02B	PHA02B	Are there any prerequisite courses for students taking these physics programs/tracks?
CQPA-02BT	PHA02BT	If Yes…Please explain:
CQPA-03A	PHA03A	Summarize the physics curriculum that was in effect for the students assessed in TIMSS Advanced 2015.
CQPA-03B	PHA03B	In what year was the physics curriculum introduced?
CQPA-03BT	PHA03BT	In what year was the physics curriculum introduced? Comments:
CQPA-03C	PHA03C	Is the physics curriculum currently being revised?
CQPA-03CTA	PHA03CTA	If Yes…Please explain:
CQPA-03CTB	PHA03CTB	If No…Comments:
CQPA-04	PHA04	Is there a process for approving the physics instructional materials?
CQPA-04T	PHA04T	If Yes...Please describe the process, and what materials (e.g., textbooks, workbooks, online materials) must be approved through this process:
CQPA-05A	PHA05A	Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in physics instruction?
CQPA-05ATA	PHA05ATA	If Yes...What are the statements/policies?
CQPA-05ATB	PHA05ATB	Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in physics instruction? Comments:
CQPA-05B	PHA05B	Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in physics tests or examinations?
CQPA-05BTA	PHA05BTA	If Yes...What are the statements/policies?
CQPA-05BTB	PHA05BTB	Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in physics tests or examinations? Comments:
CQPA-06A	PHA06A	Does an educational authority in your country (e.g., National Ministry of Education) administer examinations to students in these physics programs/tracks that have consequences for individual students, such as entry to a university?
CQPA-06B	PHA06B	If Yes...Please describe the secondary school grades at which the exams are given to students in each of these programs/tracks and the purpose of each exam.
CQPA-06C	PHA06C	What is the nature and format of the examinations, and do they have an oral component?
CQPA-06D	PHA06D	Additional comments on the examination system
CQPA-07Aa	PHA07AA	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: Applying Newton's laws and laws of motion
CQPA-07Ab	PHA07AB	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: Forces, including frictional force, acting on a body
CQPA-07Ac	PHA07AC	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time

Exhibit S1.7: Index of International Variables for the TIMSS Advanced 2015 Physics Curriculum Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)
CQPA-07Ad	PHA07AD	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: The law of gravitation in relation to the movement of celestial objects
CQPA-07Ae	PHA07AE	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: Kinetic and potential energy; conservation of mechanical energy
CQPA-07Af	PHA07AF	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: The law of conservation of momentum; elastic and inelastic collisions
CQPA-07Ag	PHA07AG	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: The first law of thermodynamics
CQPA-07Ah	PHA07AH	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: Heat transfer and specific heat capacities
CQPA-07Ai	PHA07AI	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics: The law of ideal gases; expansion of solids and liquids in relation to temperature change
CQPA-07AT	PHA07AT	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Mechanics and Thermodynamics topics: Comments:
CQPA-07Ba	PHA07BA	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism: Electrostatic attraction or repulsion between isolated charged particles—Coulomb's law
CQPA-07Bb	PHA07BB	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism: Charged particles in an electric field
CQPA-07Bc	PHA07BC	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism: Electrical circuits; using Ohm's law and Joule's law
CQPA-07Bd	PHA07BD	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism: Charged particles in a magnetic field
CQPA-07Be	PHA07BE	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism: Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction
CQPA-07Bf	PHA07BF	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism: Faraday's and Lenz's laws of induction
CQPA-07BT	PHA07BT	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Electricity and Magnetism topics: Comments:
CQPA-07Ca	PHA07CA	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: Mechanical waves; the relationship between speed, frequency, and wavelength

Exhibit S1.7: Index of International Variables for the TIMSS Advanced 2015 Physics Curriculum Questionnaire (Continued)

TIMSS Advanced 2015 Question Number	TIMSS Advanced 2015 Variable Name	TIMSS Advanced 2015 Variable Description (See questionnaire for full item text)
CQPA-07Cb	PHA07CB	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays)
CQPA-07Cc	PHA07CC	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: Thermal radiation, temperature, and wavelength
CQPA-07Cd	PHA07CD	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: Reflection, refraction, interference, and diffraction
CQPA-07Ce	PHA07CE	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons
CQPA-07Cf	PHA07CF	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: Wave-particle duality and the photoelectric effect; types of nuclear reactions and their role in nature (e.g., in stars) and society; radioactive isotopes
CQPA-07Cg	PHA07CG	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics: Mass-energy equivalence in nuclear reactions and particle transformations
CQPA-07CT	PHA07CT	According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)? Wave Phenomena and Atomic/Nuclear Physics topics: Comments:
CQPA-08a	PHA08A	How is the implementation of the physics curriculum evaluated? Visits by inspectors
CQPA-08b	PHA08B	How is the implementation of the physics curriculum evaluated? Research programs
CQPA-08c	PHA08C	How is the implementation of the physics curriculum evaluated? School self-evaluation
CQPA-08d	PHA08D	How is the implementation of the physics curriculum evaluated? National or regional examinations
CQPA-08e	PHA08E	How is the implementation of the physics curriculum evaluated? Other
CQPA-08eT	PHA08ET	How is the implementation of the physics curriculum evaluated? Other, please specify below:
CQPA-08T	PHA08T	How is the implementation of the physics curriculum evaluated? Comments
CQPA-09A	PHA09A	Does your country sponsor national programs to encourage students to study physics?
CQPA-09Ba	PHA09BA	If Yes...Does your country implement any of the following programs to promote the study of physics? School partnerships with industry
CQPA-09Bb	PHA09BB	If Yes...Does your country implement any of the following programs to promote the study of physics? School collaborations with universities
CQPA-09Bc	PHA09BC	If Yes...Does your country implement any of the following programs to promote the study of physics? Contests/competitions in physics
CQPA-09Bd	PHA09BD	If Yes...Does your country implement any of the following programs to promote the study of physics? Other
CQPA-09BdT	PHA09BDT	If Yes...Does your country implement any of the following programs to promote the study of physics? Other, please specify:
CQPA-09BT	PHA09BT	If Yes...Does your country implement any of the following programs to promote the study of physics? If applicable, please describe the programs implemented in your country to promote the study of physics:
CQPA-10	PHA10	Describe the national requirements for being a teacher of the physics programs/tracks being assessed in TIMSS Advanced.
CQPA-11	PHA11	Does your country experience any difficulties recruiting or retaining physics teachers of students at the end of upper secondary school?
CQPA-11T	PHA11T	If Yes…Comments:

TIMSS Advanced 2015

TIMSS Advanced 2015 Curriculum Questionnaire—Physics

P
Physics

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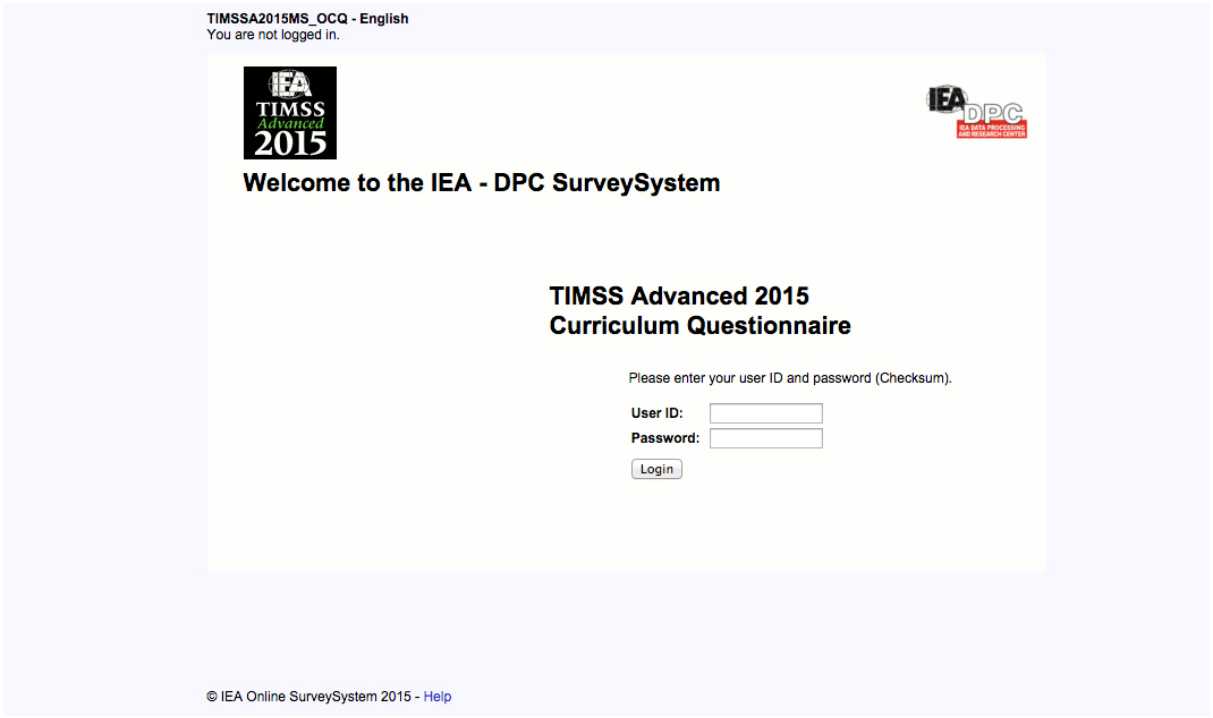
TIMSSA2015MS_OCQ - English
You are not logged in.
Welcome to the IEA - DPC SurveySystem
TIMSS Advanced 2015
Curriculum Questionnaire
Please enter your user ID and password (Checksum).
User ID:
Password:
Login
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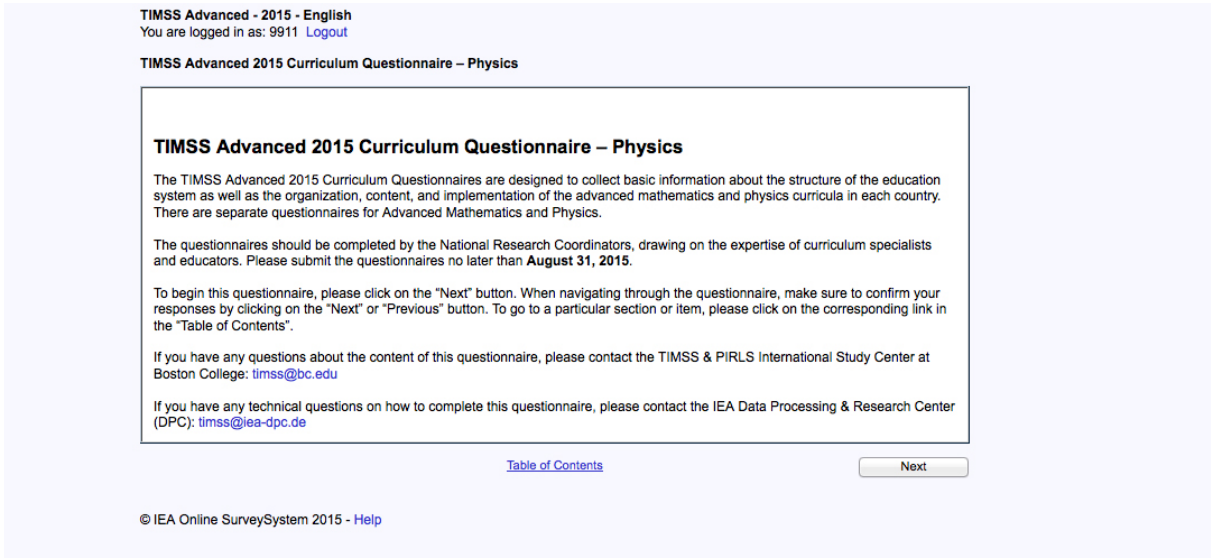

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TIMSS Advanced 2015 Curriculum Questionnaire – Physics

TIMSS Advanced 2015 Curriculum Questionnaire – Physics

The TIMSS Advanced 2015 Curriculum Questionnaires are designed to collect basic information about the structure of the education system as well as the organization, content, and implementation of the advanced mathematics and physics curricula in each country. There are separate questionnaires for Advanced Mathematics and Physics.

The questionnaires should be completed by the National Research Coordinators, drawing on the expertise of curriculum specialists and educators. Please submit the questionnaires no later than **August 31, 2015**.

To begin this questionnaire, please click on the "Next" button. When navigating through the questionnaire, make sure to confirm your responses by clicking on the "Next" or "Previous" button. To go to a particular section or item, please click on the corresponding link in the "Table of Contents".

If you have any questions about the content of this questionnaire, please contact the TIMSS & PIRLS International Study Center at Boston College: timss@bc.edu

If you have any technical questions on how to complete this questionnaire, please contact the IEA Data Processing & Research Center (DPC): timss@iea-dpc.de

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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - About the Physics Programs (Tracks)

About the Physics Programs (Tracks)

This questionnaire refers to the national physics curriculum that was in effect for the students assessed in TIMSS Advanced 2015—the curriculum that covers physics instruction for the majority of students in these programs or tracks. If you do not have a national curriculum, please summarize for your state or provincial curricula.

PHA01A

1. A. Describe the physics programs/tracks assessed by TIMSS Advanced 2015. How do the programs/tracks fit into the overall curriculum from the first grade through the final year? How do they relate with programs at the university level, if at all (e.g., is participation a prerequisite for studying certain fields such as engineering or medicine)?

Examples of information reported for TIMSS Advanced 2008 can be found in the second column of Exhibit 7.1 on pages 220-221 of the 2008 report. Click here to view

PHA01B

B. How many years are students in these programs/tracks, and at which grade do they start?

Examples of information reported for TIMSS Advanced 2008 can be found in the third column of Exhibit 7.1 on pages 220-221 of the 2008 report. Click here to view

PHA01C

C. What is the total amount of class time in physics for the students in the physics programs/tracks?

Examples of information reported for TIMSS Advanced 2008 can be found in the fourth column of Exhibit 7.1 on pages 220-221 of the 2008 report. Click here to view

hours per year (1 hour = 60 minutes)

Comments:

PHA01CT

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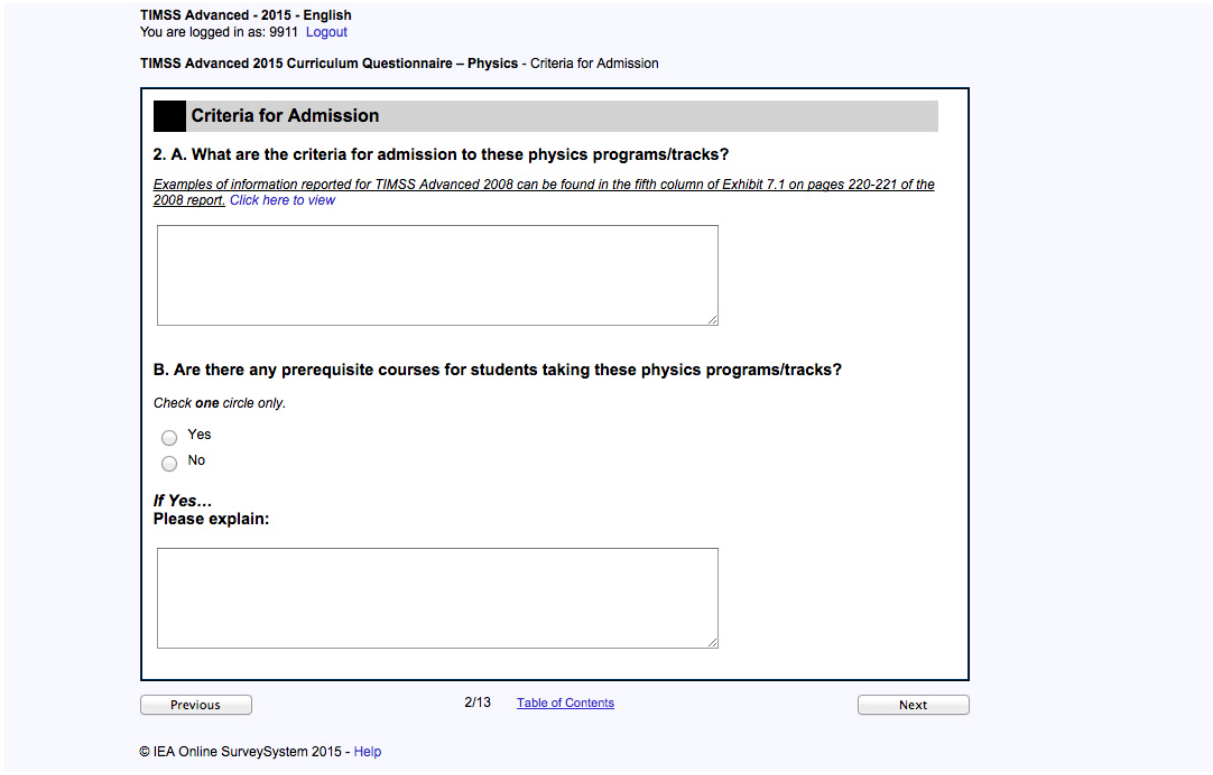

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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Criteria for Admission

Criteria for Admission

PHA02A

2. A. What are the criteria for admission to these physics programs/tracks?

Examples of information reported for TIMSS Advanced 2008 can be found in the fifth column of Exhibit 7.1 on pages 220-221 of the 2008 report. Click here to view

PHA02B

B. Are there any prerequisite courses for students taking these physics programs/tracks?

*Check **one** circle only.*

- Yes
- No

PHA02BT

If Yes…
Please explain:

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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Curriculum

Physics Curriculum

PHA03A

3. A. Summarize the physics curriculum that was in effect for the students assessed in TIMSS Advanced 2015. (750 words)

If applicable, please reference your country's curricular documents.

PHA03B

B. In what year was the physics curriculum introduced?

Examples of information reported for TIMSS Advanced 2008 can be found in the second column of Exhibit 7.3 on page 226 of the 2008 report. Click here to view

PHA03BT

Comments:

(Continued on Next Page)

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TIMSS Advanced - 2015 - English
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(Continued)

TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Curriculum

PHA03C

C. Is the physics curriculum currently being revised?

Examples of information reported for TIMSS Advanced 2008 can be found in the third column of Exhibit 7.3 on page 226 of the 2008 report. Click here to view

*Check **one** circle only.*

- ○ Yes
- ○ No

If Yes...
Please explain:

PHA03CTA

If No...
Comments:

PHA03CTB

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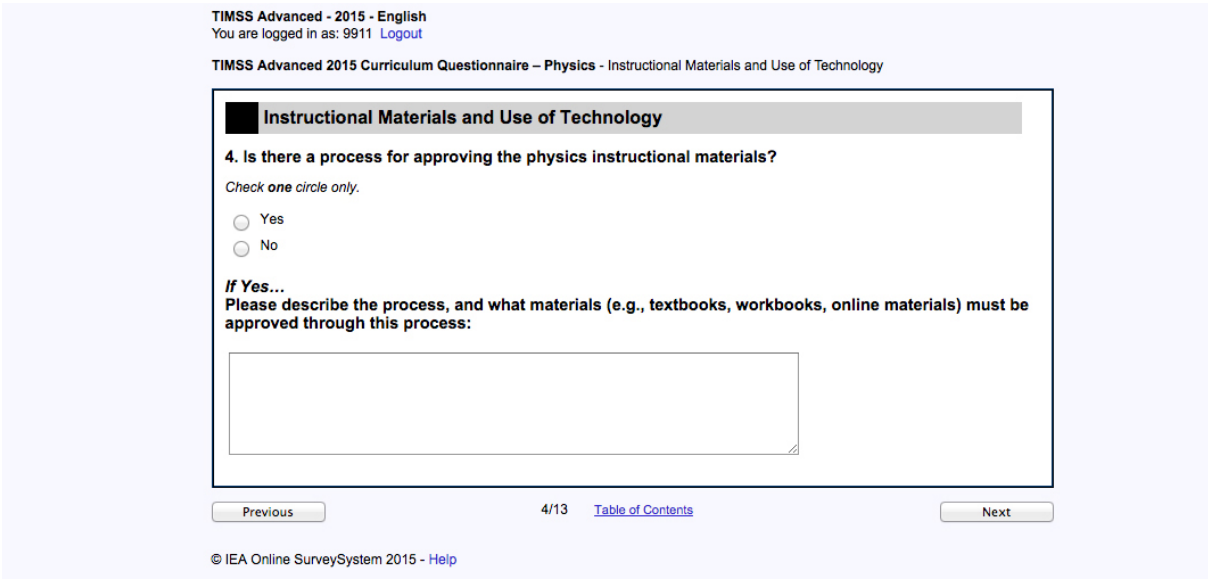
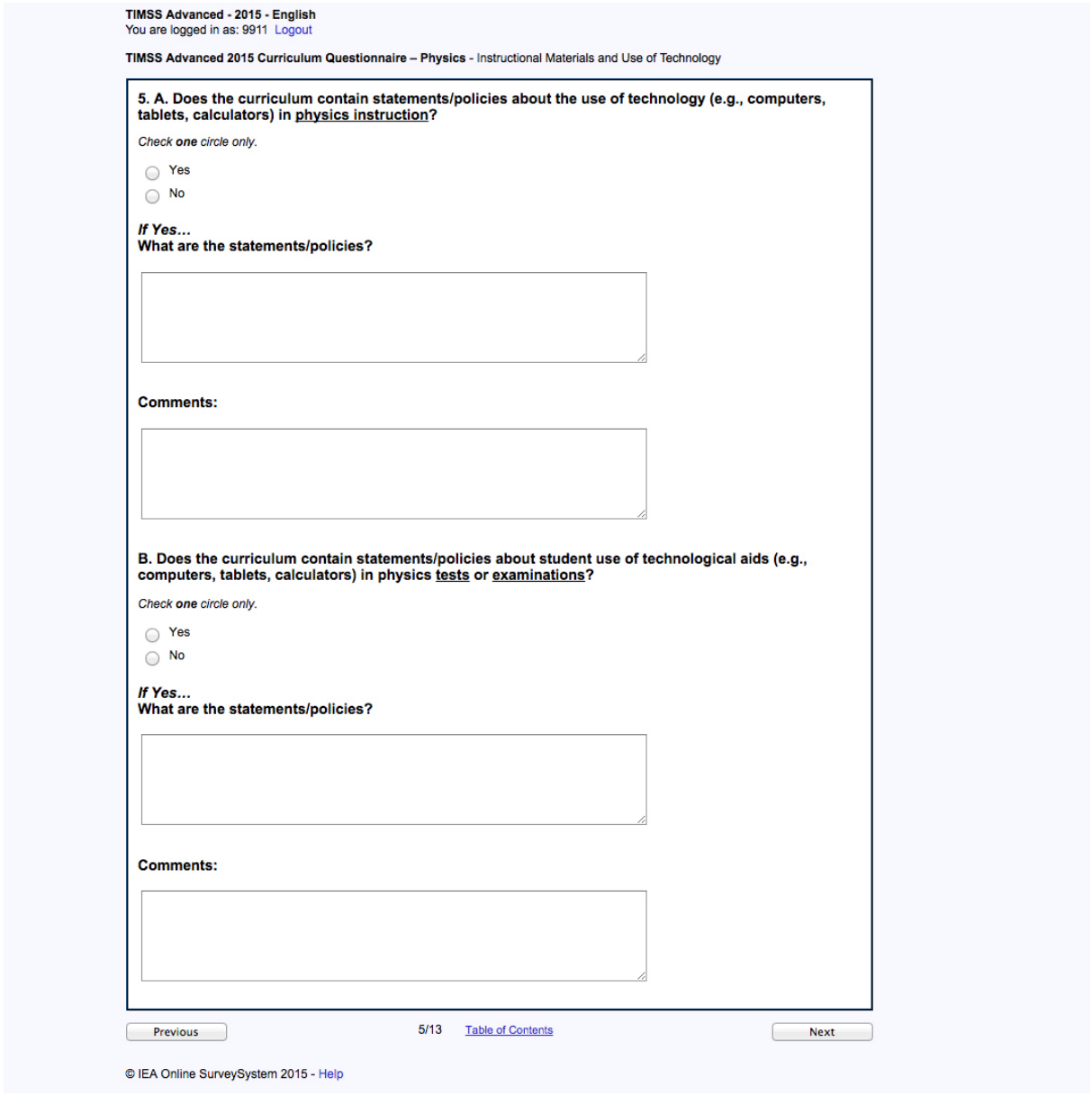
PHA04

PHA04T





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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Instructional Materials and Use of Technology

PHA05A

5. A. Does the curriculum contain statements/policies about the use of technology (e.g., computers, tablets, calculators) in physics instruction?

*Check **one** circle only.*

- Yes
- No

If Yes…
What are the statements/policies?

PHA05ATA

Comments:

PHA05ATB

PHA05B

B. Does the curriculum contain statements/policies about student use of technological aids (e.g., computers, tablets, calculators) in physics tests or examinations?

*Check **one** circle only.*

- Yes
- No

If Yes…
What are the statements/policies?

PHA05BTA

Comments:

PHA05BTB

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TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Examinations

Examinations

PHA06A

6. A. Does an educational authority in your country (e.g., National Ministry of Education) administer examinations to students in these physics programs/tracks that have consequences for individual students, such as entry to a university?

*Check **one** circle only.*

- Yes
- No

PHA06B

If Yes....
B. Please describe the secondary school grades at which the exams are given to students in each of these programs/tracks and the purpose of each exam.

Examples of information reported for TIMSS Advanced 2008 can be found in the third and fifth columns of Exhibit 7.6 on pages 230-231 of the 2008 report. Click here to view

PHA06C

C. What is the nature and format of the examinations, and do they have an oral component?

Examples of information reported for TIMSS Advanced 2008 can be found in the fourth column of Exhibit 7.6 on pages 230-231 of the 2008 report. Click here to view

PHA06D

D. Additional comments on the examination system

Examples of information reported for TIMSS Advanced 2008 can be found in the sixth column of Exhibit 7.6 on pages 230-231 of the 2008 report. Click here to view

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TIMSS Advanced 2015

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Topics Covered

Physics Topics Covered

7. According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., expansion of solids and liquids in relation to temperature change in part A topic (i)], please explain in the comment field.

*Check **one** circle for each line.*

	A. Mechanics and Thermodynamics	**Yes**	**No**
PHA07AA	a) Applying Newton's laws and laws of motion	○	○
PHA07AB	b) Forces, including frictional force, acting on a body	○	○
PHA07AC	c) Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time	○	○
PHA07AD	d) The law of gravitation in relation to the movement of celestial objects	○	○
PHA07AE	e) Kinetic and potential energy; conservation of mechanical energy	○	○
PHA07AF	f) The law of conservation of momentum; elastic and inelastic collisions	○	○
PHA07AG	g) The first law of thermodynamics	○	○
PHA07AH	h) Heat transfer and specific heat capacities	○	○
PHA07AI	i) The law of ideal gases; expansion of solids and liquids in relation to temperature change	○	○

Comments:

PHA07AT

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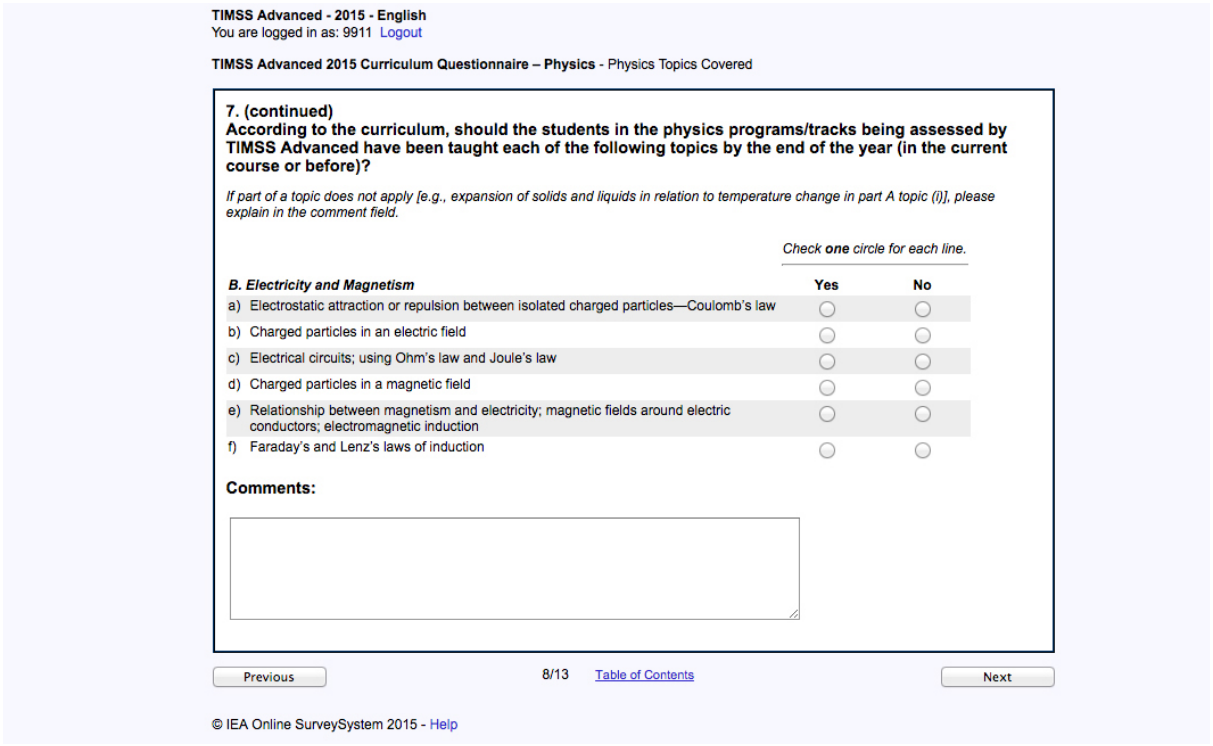

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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Topics Covered

7. (continued)
According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., expansion of solids and liquids in relation to temperature change in part A topic (i)], please explain in the comment field.

*Check **one** circle for each line.*

	B. Electricity and Magnetism	**Yes**	**No**
PHA07BA	a) Electrostatic attraction or repulsion between isolated charged particles—Coulomb's law	○	○
PHA07BB	b) Charged particles in an electric field	○	○
PHA07BC	c) Electrical circuits; using Ohm's law and Joule's law	○	○
PHA07BD	d) Charged particles in a magnetic field	○	○
PHA07BE	e) Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction	○	○
PHA07BF	f) Faraday's and Lenz's laws of induction	○	○

Comments:

PHA07BT

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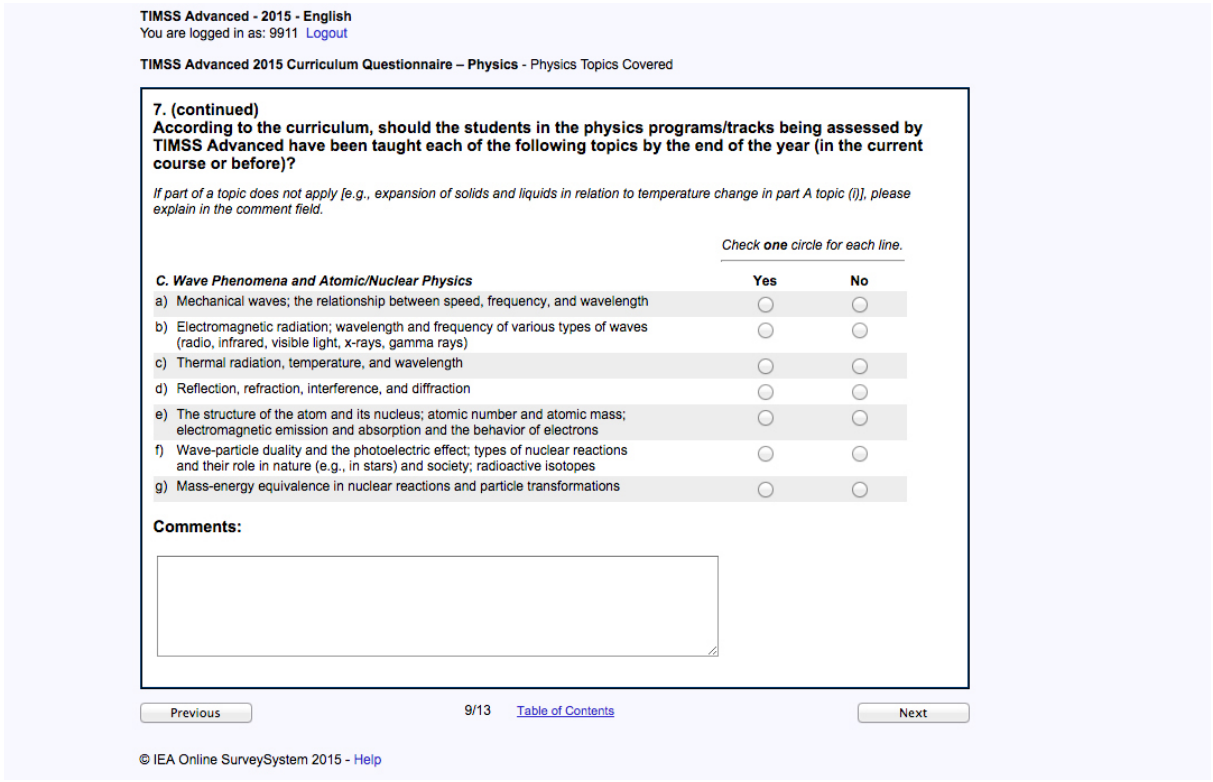

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Topics Covered

7. (continued)
According to the curriculum, should the students in the physics programs/tracks being assessed by TIMSS Advanced have been taught each of the following topics by the end of the year (in the current course or before)?

If part of a topic does not apply [e.g., expansion of solids and liquids in relation to temperature change in part A topic (i)], please explain in the comment field.

*Check **one** circle for each line.*

	C. Wave Phenomena and Atomic/Nuclear Physics	**Yes**	**No**
PHA07CA	a) Mechanical waves; the relationship between speed, frequency, and wavelength	○	○
PHA07CB	b) Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays)	○	○
PHA07CC	c) Thermal radiation, temperature, and wavelength	○	○
PHA07CD	d) Reflection, refraction, interference, and diffraction	○	○
PHA07CE	e) The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons	○	○
PHA07CF	f) Wave-particle duality and the photoelectric effect; types of nuclear reactions and their role in nature (e.g., in stars) and society; radioactive isotopes	○	○
PHA07CG	g) Mass-energy equivalence in nuclear reactions and particle transformations	○	○

Comments:

PHA07CT

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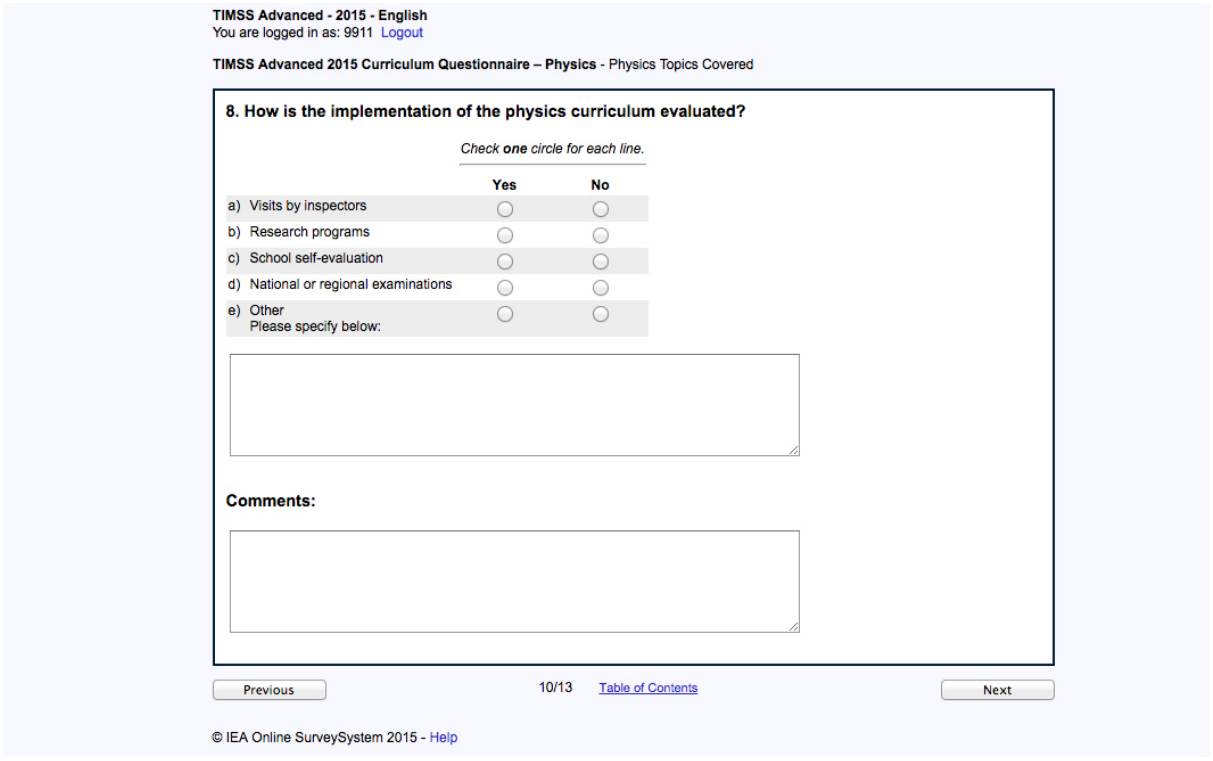

TIMSS Advanced - 2015 - English
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Topics Covered

8. How is the implementation of the physics curriculum evaluated?

*Check **one** circle for each line.*

	Yes	No
a) Visits by inspectors	○	○
b) Research programs	○	○
c) School self-evaluation	○	○
d) National or regional examinations	○	○
e) Other Please specify below:	○	○

PHA08A
PHA08B
PHA08C
PHA08D
PHA08E

PHA08ET

Comments:

PHA08T

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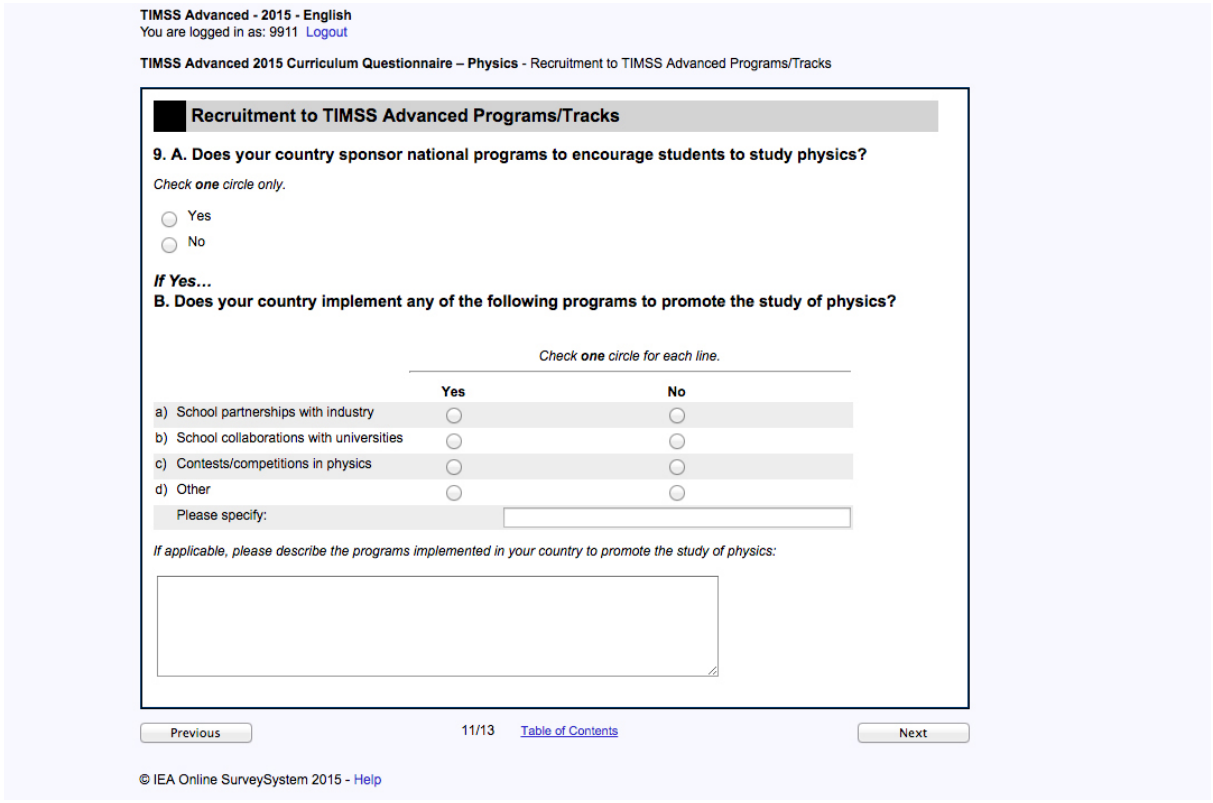

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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Recruitment to TIMSS Advanced Programs/Tracks

Recruitment to TIMSS Advanced Programs/Tracks

PHA09A

9. A. Does your country sponsor national programs to encourage students to study physics?

*Check **one** circle only.*

- ○ Yes
- ○ No

If Yes...

B. Does your country implement any of the following programs to promote the study of physics?

*Check **one** circle for each line.*

	Yes	No
a) School partnerships with industry	○	○
b) School collaborations with universities	○	○
c) Contests/competitions in physics	○	○
d) Other	○	○
Please specify:		

PHA09BA
PHA09BB
PHA09BC
PHA09BD
PHA09BDT

If applicable, please describe the programs implemented in your country to promote the study of physics:

PHA09BT

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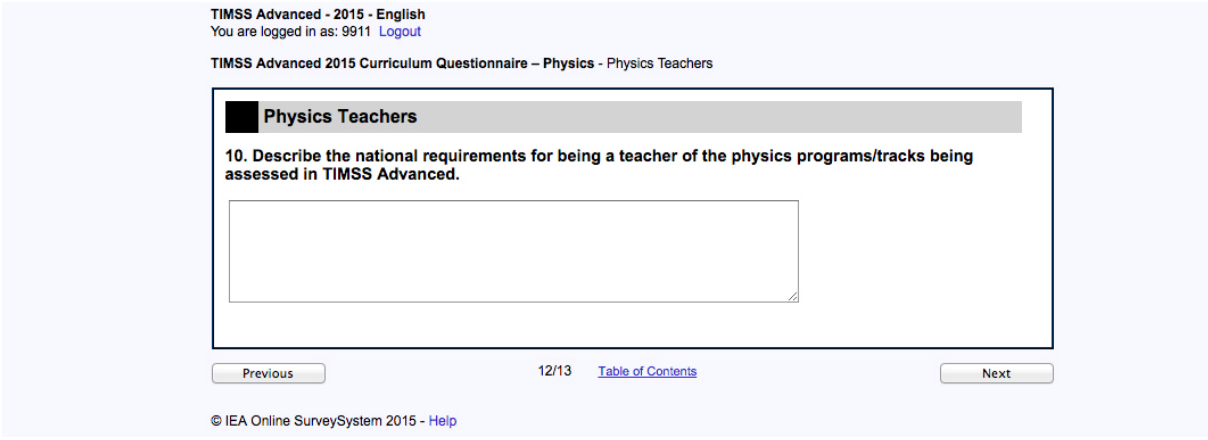
PHA10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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Teachers
Physics Teachers
10. Describe the national requirements for being a teacher of the physics programs/tracks being assessed in TIMSS Advanced.
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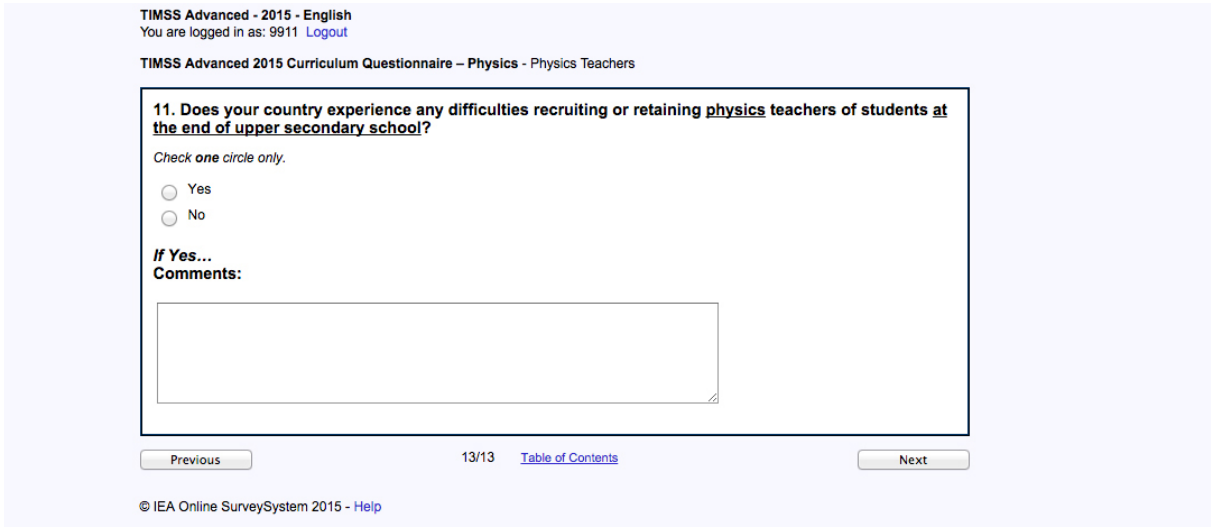
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics - Physics Teachers

PHA11

11. Does your country experience any difficulties recruiting or retaining physics teachers of students at the end of upper secondary school?

Check one circle only.

- Yes
- No

If Yes…
Comments:

PHA11T

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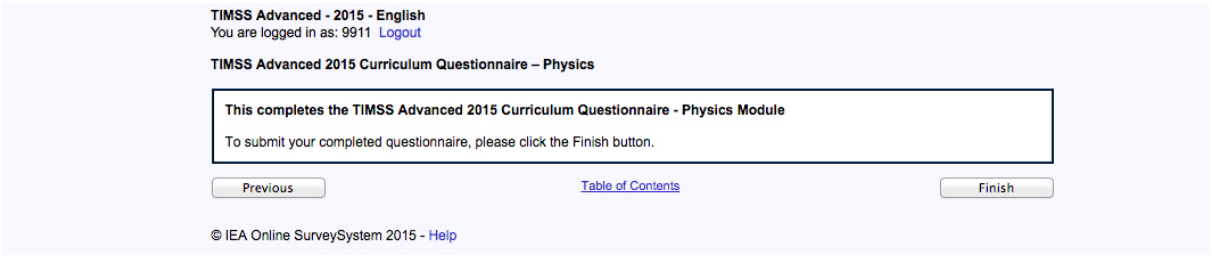
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TIMSS Advanced 2015 Curriculum Questionnaire – Physics

This completes the TIMSS Advanced 2015 Curriculum Questionnaire - Physics Module

To submit your completed questionnaire, please click the Finish button.

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TIMSS Advanced 2015

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P
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