IEA TIMSS LONGITUDINAL 2023–2024

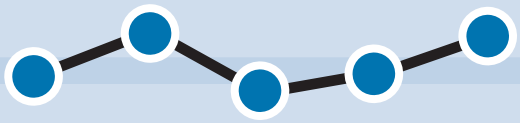
Identification Label

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

# Teacher Questionnaire Science

## <Grade 9>

**<TIMSS National Research Center Name>**
<Address>



IEA
TIMSS & PIRLS International Study Center
Lynch School of Education
BOSTON COLLEGE

# **Teacher** *Questionnaire*

Some of your students have been selected to participate in the TIMSS 2023 (Trends in International Mathematics and Science Study) Longitudinal Study, an educational research project sponsored by the International Association for the Evaluation of Educational Achievement (IEA). TIMSS 2023 Longitudinal follows students for one year (from 2023 to 2024) to measure learning gains in mathematics and science and studies differences in national education systems in countries to help improve teaching and learning worldwide.

This questionnaire is addressed to teachers of the <ninth grade> students who participated in the TIMSS 2023 data collection during the last school year and who are currently participating in the TIMSS 2023 Longitudinal data collection in 2024. This questionnaire seeks information about teachers' academic and professional backgrounds, classroom resources, and instructional practices. Since these students have been selected as part of a nationwide sample, your responses are very important in helping to describe secondary education in <country>, and to explain students' learning gains.

<You may have completed a similar questionnaire last school year as part of data collection for TIMSS 2023; if this is the case, we ask that you please complete this follow-up questionnaire to help us measure school factors related to students' learning gains and achievement over time.>

Some of the questions in the questionnaire refer to the <"**TIMSS class** that" or the "**TIMSS students** who"> will be tested as part of TIMSS 2023 Longitudinal. This is the class that is identified on the front of this booklet. Please keep this group in mind when responding to class-specific questions. 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 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** 2023
LONGITUDINAL

## 1

**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

**Which of these describes you?**

*Check **one** circle only.*

Female ---
Male ---
<Other> ---

## 3

**How old are you?**

*Check **one** circle only.*

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

## 4

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

*Check **one** circle only.*

Did not complete <Upper secondary education—ISCED Level 3> ---
<Upper secondary education—ISCED Level 3> ---

**(If you have not completed <post-secondary or tertiary education>, go to #6)**

<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> ---

## 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 | ○ | ○ |
| b) Biology | ○ | ○ |
| c) Physics | ○ | ○ |
| d) Chemistry | ○ | ○ |
| e) <Earth Science> | ○ | ○ |
| f) Education–Mathematics | ○ | ○ |
| g) Education–Science | ○ | ○ |
| h) Education–General | ○ | ○ |
| i) Other | ○ | ○ |

## School Emphasis on Academic Success

**6**

**How would you characterize each of the following within your school?**

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

| | Very high | High | Medium | Low | Very low |
|---|---|---|---|---|---|
| a) Teachers' understanding of the school's curricular goals | ○ | ○ | ○ | ○ | ○ |
| b) Teachers' degree of success in implementing the school's curriculum | ○ | ○ | ○ | ○ | ○ |
| c) Teachers' expectations for student achievement | ○ | ○ | ○ | ○ | ○ |
| d) Teachers' ability to inspire students | ○ | ○ | ○ | ○ | ○ |
| e) Parental involvement in school activities | ○ | ○ | ○ | ○ | ○ |
| f) Parental commitment to ensure that students are ready to learn | ○ | ○ | ○ | ○ | ○ |
| g) Parental expectations for student achievement | ○ | ○ | ○ | ○ | ○ |
| h) Parental support for student achievement | ○ | ○ | ○ | ○ | ○ |
| i) Students' desire to do well in school | ○ | ○ | ○ | ○ | ○ |
| j) Students' ability to reach school's academic goals | ○ | ○ | ○ | ○ | ○ |
| k) Students' respect for classmates who excel academically | ○ | ○ | ○ | ○ | ○ |

## About Being a Teacher

**7**

**How often do you have these feelings about being a teacher?**

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

| | Very often | Often | Sometimes | Never or almost never |
|---|---|---|---|---|
| a) I am content with my profession as a teacher | ○ | ○ | ○ | ○ |
| b) I find my work full of meaning and purpose | ○ | ○ | ○ | ○ |
| c) I am enthusiastic about my job | ○ | ○ | ○ | ○ |
| d) My work inspires me | ○ | ○ | ○ | ○ |
| e) I am proud of the work I do | ○ | ○ | ○ | ○ |
| f) I feel appreciated as a teacher | ○ | ○ | ○ | ○ |
| g) I enjoy the challenges of teaching | ○ | ○ | ○ | ○ |

## 8

**How many students are in <this class>?**

_____ students
*Write in the number.*

## 9

**How many <ninth grade> students experience difficulties understanding spoken <language of test>?**

_____ students in this class
*Write in the number.*

## 10

**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 |
|---|---|---|---|---|
| a) Relate the lesson to students' daily lives | ○ | ○ | ○ | ○ |
| b) Ask students to explain their answers | ○ | ○ | ○ | ○ |
| c) Communicate goals or objectives for the lesson to the students | ○ | ○ | ○ | ○ |
| d) Ask students to complete challenging exercises that require them to go beyond the instruction | ○ | ○ | ○ | ○ |
| e) Encourage classroom discussions among students | ○ | ○ | ○ | ○ |
| f) Link new content to students' prior knowledge | ○ | ○ | ○ | ○ |
| g) Ask students to decide their own problem solving procedures | ○ | ○ | ○ | ○ |

## 11

**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 |
|---|---|---|---|
| a) Students lacking prerequisite knowledge or skills | ○ | ○ | ○ |
| b) Students suffering from lack of basic nutrition | ○ | ○ | ○ |
| c) Students suffering from not enough sleep | ○ | ○ | ○ |
| d) Students absent from class | ○ | ○ | ○ |
| e) Disruptive students | ○ | ○ | ○ |
| f) Uninterested students | ○ | ○ | ○ |
| g) Distracted students | ○ | ○ | ○ |
| h) Students with mental, emotional, or psychological impairment | ○ | ○ | ○ |
| i) Students with difficulties understanding the language of instruction | ○ | ○ | ○ |

## 12

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

_____ minutes per week

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

## 13

**In teaching science to the students in this class, how often do you ask them to do the following?**

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

| | Every or almost every lesson | About half the lessons | Some lessons | Never |
|---|---|---|---|---|
| a) Listen to me explain new science content | ○ | ○ | ○ | ○ |
| b) Observe natural phenomena and describe what they see | ○ | ○ | ○ | ○ |
| c) Watch me demonstrate an experiment or investigation | ○ | ○ | ○ | ○ |
| d) Read their textbooks or other resource materials | ○ | ○ | ○ | ○ |
| e) Memorize facts and principles | ○ | ○ | ○ | ○ |
| f) Use scientific formulas and laws to solve routine problems | ○ | ○ | ○ | ○ |
| g) Do field work outside of class | ○ | ○ | ○ | ○ |
| h) Work in mixed ability groups | ○ | ○ | ○ | ○ |
| i) Work in same ability groups | ○ | ○ | ○ | ○ |

## 14

**How much emphasis do you place on the following when teaching science to students in this class?**

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

| | A lot | Some | None |
|---|---|---|---|
| a) Encouraging students to ask questions about scientific phenomena | ○ | ○ | ○ |
| b) Having students predict the outcomes of experiments or investigations | ○ | ○ | ○ |
| c) Having students discuss variation in data from experiments or investigations | ○ | ○ | ○ |
| d) Having students use multiple sources of evidence to explain scientific phenomena | ○ | ○ | ○ |
| e) Having students create representations (e.g., models, graphs) to explain scientific phenomena | ○ | ○ | ○ |
| f) Having students use scientific concepts to explain phenomena | ○ | ○ | ○ |
| g) Having students argue about science questions | ○ | ○ | ○ |
| h) Having students conduct experiments (hands-on or virtually) | ○ | ○ | ○ |

## 15

**In teaching science to this class, how confident do you feel about your ability to do the following?**

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

| | Very confident | Somewhat confident | Not confident |
|---|---|---|---|
| a) Help students appreciate the value of learning science | ○ | ○ | ○ |
| b) Explain science concepts or principles using experiments or other hands-on activities | ○ | ○ | ○ |
| c) Adapt teaching to engage students' interests | ○ | ○ | ○ |
| d) Develop students' higher-order thinking skills | ○ | ○ | ○ |
| e) Make science relevant to students | ○ | ○ | ○ |
| f) Provide challenging science activities for excelling students | ○ | ○ | ○ |
| g) Improve science understanding of struggling students | ○ | ○ | ○ |
| h) Assess students' comprehension of science content | ○ | ○ | ○ |
| i) Incorporate inquiry methods into science teaching | ○ | ○ | ○ |
| j) Manage student behavior during experiments or other hands-on activities | ○ | ○ | ○ |

## 16

**How often do you do the following when teaching this class?**

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

| | At least once a week | Once or twice a month | A few times a year | Never or almost never |
|---|---|---|---|---|
| a) Develop students' positive attitudes toward the natural environment | ◯ | ◯ | ◯ | ◯ |
| b) Encourage students to use less resources (e.g., <water, energy>) | ◯ | ◯ | ◯ | ◯ |
| c) Discuss how student actions in and outside of school can help the natural environment | ◯ | ◯ | ◯ | ◯ |
| d) Discuss environmental issues (e.g., <climate change, endangered animals>) | ◯ | ◯ | ◯ | ◯ |

## 17

**Do you do these things to teach students about environmental issues and sustainability?**

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

| | Yes | No |
|---|---|---|
| a) Take students to visit natural areas (e.g., <a pond or meadow>) | ◯ | ◯ |
| b) Have students participate in environmentally responsible activities (e.g., <pick up trash>) | ◯ | ◯ |
| c) Have students do research or projects on a particular environmental topic (e.g., <pollution, climate change>) | ◯ | ◯ |
| d) Provide opportunities for students to participate in outdoor environmental education programs outside of school | ◯ | ◯ |

## 18

**How much do you agree or disagree that education about environmental sustainability should be a priority for schools?**

*Check **one** circle only.*

- Agree a lot ◯
- Agree a little ◯
- Disagree a little ◯
- Disagree a lot ◯

## 19

**A. Do the students in this class have digital devices (including computers, tablets, or smartphones) available to use during science lessons?**

*Check **one** circle only.*

Yes ---
No ---

**(If No, go to #20)**

**If Yes,**

**B. What access do the students have to digital devices?**

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

| | Yes | No |
|---|---|---|
| a) The class has digital devices for each student to use | | |
| b) The class has digital devices that students can share | | |
| c) The school has digital devices that the class can use sometimes | | |
| d) Students bring their own digital devices | | |

**C. How often do you have students use digital devices during science instruction?**

*Check **one** circle only.*

At least once a week ---
Once or twice a month ---
A few times a year ---
Never or almost never ---

**D. How often do you ask the students in your class to use digital devices to do these science activities?**

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

| | At least once a week | Once or twice a month | A few times a year | Never or almost never |
|---|---|---|---|---|
| a) Solve extended or contextualized problems | | | | |
| b) Create graphs, tables, or other data displays | | | | |
| c) Play games involving science concepts | | | | |
| d) Conduct virtual experiments or other simulations | | | | |
| e) Read the textbook or watch instructional videos | | | | |
| f) Take a test | | | | |

## 20

**The following list includes topics and concepts addressed by the TIMSS science test. Choose the response that best describes when each topic or concept is taught for students in this class.**

**If a topic or concept was in the curriculum before <ninth grade>, choose "Mostly taught before this year." If you have taught a topic this year, choose "Mostly taught this year." If a topic is not in the <ninth grade> curriculum for this year or you have not yet taught a topic, choose "Not yet taught."**

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

| | Mostly taught before this year | Mostly taught this year | Not yet taught |
|---|---|---|---|
| **A. Biology** | | | |
| a) Defining characteristics of major taxonomic groups of organisms | ○ | ○ | ○ |
| b) Structures and functions of major organs and organ systems | ○ | ○ | ○ |
| c) How animals maintain stable body conditions | ○ | ○ | ○ |
| d) Major structures and functions in plant and animal cells | ○ | ○ | ○ |
| e) Basic processes of photosynthesis | ○ | ○ | ○ |
| f) Basic processes of cellular respiration | ○ | ○ | ○ |
| g) Life cycles of mammals, birds, amphibians, insects, and plants | ○ | ○ | ○ |
| h) Processes for reproduction and inheritance in plants and animals | ○ | ○ | ○ |
| i) How variation in traits relates to natural selection and changes in life on Earth over time | ○ | ○ | ○ |
| j) Interpreting food web diagrams and the flow of energy in ecosystems | ○ | ○ | ○ |
| k) Cycling of water, oxygen, and carbon through ecosystems | ○ | ○ | ○ |
| l) Predation, competition, and symbiosis in ecosystems | ○ | ○ | ○ |
| m) How changes in an ecosystem affect the populations of organisms that live there | ○ | ○ | ○ |
| n) How human actions can positively or negatively impact the environment | ○ | ○ | ○ |
| o) How to prevent transmission of common diseases among humans | ○ | ○ | ○ |
| p) Importance of diet, exercise, and lifestyle choices for maintaining good human health | ○ | ○ | ○ |
| **B. Chemistry** | | | |
| a) Structure of atoms (i.e., protons, neutrons, electrons) and molecules | ○ | ○ | ○ |
| b) Differences among elements, compounds, and mixtures | ○ | ○ | ○ |
| c) How to interpret the periodic table of elements | ○ | ○ | ○ |
| d) Classifying matter according to physical and chemical properties | ○ | ○ | ○ |
| e) Methods for separating mixtures | ○ | ○ | ○ |
| f) Solution concentration and rate of dissolving | ○ | ○ | ○ |
| g) Properties of acids and bases | ○ | ○ | ○ |
| h) Matter and energy in chemical reactions, including evidence of chemical change | ○ | ○ | ○ |
| i) How to change the rate of chemical reactions | ○ | ○ | ○ |
| j) Chemical bonds (e.g., role of electrons) | ○ | ○ | ○ |

**20** **(continued)**

**Choose the response that best describes when each topic or concept is taught for students in this class.**

**If a topic or concept was in the curriculum before <ninth grade>, choose "Mostly taught before this year." If you have taught a topic this year, choose "Mostly taught this year." If a topic is not in the <ninth grade> curriculum for this year or you have not yet taught a topic, choose "Not yet taught."**

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

| | Mostly taught before this year | Mostly taught this year | Not yet taught |
|---|---|---|---|
| **C. Physics** | | | |
| a) Separation and motion of atoms/molecules in solids, liquids, and gases | ○ | ○ | ○ |
| b) Characteristics of matter and energy during state changes | ○ | ○ | ○ |
| c) Types of energy (e.g., kinetic, potential, thermal) and examples of energy transformations | ○ | ○ | ○ |
| d) Thermal conductivity and the transfer of thermal energy between objects of different temperatures | ○ | ○ | ○ |
| e) Reflection, refraction, or absorption of light | ○ | ○ | ○ |
| f) Characteristics of sound (i.e., amplitude, frequency) and its transmission, reflection, and absorption | ○ | ○ | ○ |
| g) Electrical conductors and simple electrical circuits | ○ | ○ | ○ |
| h) Polarity, strength, and uses of permanent magnets and electromagnets | ○ | ○ | ○ |
| i) Speed as distance changing over time | ○ | ○ | ○ |
| j) Acceleration as speed changing over time | ○ | ○ | ○ |
| k) Effects of common forces on speed and direction of motion | ○ | ○ | ○ |
| l) Density and buoyancy | ○ | ○ | ○ |
| m) Functioning of simple machines (e.g., levers, inclined planes, pulleys) | ○ | ○ | ○ |
| **D. Earth Science** | | | |
| a) Earth's structure and distribution of water on its surface | ○ | ○ | ○ |
| b) Gases present in Earth's atmosphere and their relative abundance | ○ | ○ | ○ |
| c) Changes in temperature and pressure based on altitude | ○ | ○ | ○ |
| d) How geological events impact Earth's surface | ○ | ○ | ○ |
| e) Processes in the rock cycle (e.g., lava cooling, weathering) | ○ | ○ | ○ |
| f) How fossils form and what they show about Earth's history | ○ | ○ | ○ |
| g) Processes in Earth's water cycle | ○ | ○ | ○ |
| h) Differences between weather and climate and geographic factors affecting climate | ○ | ○ | ○ |
| i) Evidence for climate change | ○ | ○ | ○ |
| j) Use and conservation of Earth's resources, including land, water, and renewable and nonrenewable energy sources | ○ | ○ | ○ |
| k) Phenomena caused by the motion of Earth and the Moon (e.g., seasons, tides, Moon phases) | ○ | ○ | ○ |
| l) The Sun as a star and physical features of the Earth, Moon, and other planets | ○ | ○ | ○ |

## Science Homework for the <TIMSS Class/Class with the TIMSS students>

## 21

**A. How often do you usually assign science homework to the students in this class?**

*Check **one** circle only.*

- I do not assign science homework --- ○ → **(Go to #22)**
- Less than once a week --- ○
- 1 or 2 times a week --- ○
- 3 or 4 times a week --- ○
- Every day --- ○

**B. How often do you do the following with the science 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 | ○ | ○ | ○ |
| b) Have students correct their own homework | ○ | ○ | ○ |
| c) Discuss the homework in class | ○ | ○ | ○ |
| d) Monitor whether or not the homework was completed | ○ | ○ | ○ |
| e) Use the homework to contribute towards students' grades or marks | ○ | ○ | ○ |

**C. When you assign homework in science, how long do you expect it will take the average student in your class to complete?**

*Check **one** circle only.*

- 15 minutes or less --- ○
- 16-30 minutes --- ○
- 31-60 minutes --- ○
- More than 60 minutes --- ○

## Science Assessment of the <TIMSS Class/Class with the TIMSS students>

## 22

**How much importance do you place on these strategies to assess students' learning in science?**

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

| | A lot | Some | None |
|---|---|---|---|
| a) Observing students as they work | ○ | ○ | ○ |
| b) Asking students to answer questions during class | ○ | ○ | ○ |
| c) Short, regular written assessments | ○ | ○ | ○ |
| d) Longer tests (e.g., unit tests or exams) | ○ | ○ | ○ |
| e) Long-term projects | ○ | ○ | ○ |

## 23

| | A. In the past two years, have you participated in professional development in any of the following? *Check **one** circle for each line.* | | B. Do you need future professional development in any of the following? *Check **one** circle for each line.* | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| a) | Science content | ○ | ○ | ○ | ○ |
| b) | Science pedagogy/ instruction | ○ | ○ | ○ | ○ |
| c) | Science curriculum | ○ | ○ | ○ | ○ |
| d) | Integrating technology into science instruction | ○ | ○ | ○ | ○ |
| e) | Improving students' critical thinking or inquiry skills | ○ | ○ | ○ | ○ |
| f) | Science assessment | ○ | ○ | ○ | ○ |
| g) | Addressing individual students' needs | ○ | ○ | ○ | ○ |
| h) | Integrating environmentalism and sustainability into science instruction | ○ | ○ | ○ | ○ |

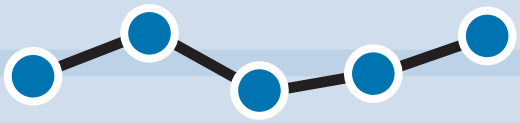
# Thank You

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

BOSTON COLLEGE

timss.bc.edu

# <Grade 9>



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