



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

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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

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

Are you female or male?

Check **one** circle only.

Female ---

Male ---

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 <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 -----	<input type="radio"/>	<input type="radio"/>
b) Physics -----	<input type="radio"/>	<input type="radio"/>
c) Biology -----	<input type="radio"/>	<input type="radio"/>
d) Chemistry -----	<input type="radio"/>	<input type="radio"/>
e) <Earth Science> -----	<input type="radio"/>	<input type="radio"/>
f) Engineering -----	<input type="radio"/>	<input type="radio"/>
g) Education– Mathematics -----	<input type="radio"/>	<input type="radio"/>
h) Education– Physics -----	<input type="radio"/>	<input type="radio"/>
i) Education– Science -----	<input type="radio"/>	<input type="radio"/>
j) Education– General -----	<input type="radio"/>	<input type="radio"/>
k) Other -----	<input type="radio"/>	<input type="radio"/>

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
a) The school encourages students to study advanced mathematics and physics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) The school promotes professional development for teachers of advanced mathematics and physics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) The school provides students with information about career options in advanced mathematics and physics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Advanced mathematics and physics teachers are admired by other teachers in the school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Teachers have high expectations for student achievement in advanced mathematics and physics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Students at this school respect students who excel in advanced mathematics and physics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Parents expect their children to study advanced mathematics and physics -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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
a) This school is located in a safe neighborhood -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I feel safe at this school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) This school's security policies and practices are sufficient -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) The students behave in an orderly manner -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) The students are respectful of the teachers -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) The students respect school property -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) This school has clear rules about student conduct -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) This school's rules are enforced in a fair and consistent manner -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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
a) The school building needs significant repair -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students) ----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Teachers do not have adequate instructional materials and supplies -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) The school classrooms are not cleaned often enough -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) The school classrooms need maintenance work -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Teachers do not have adequate technological resources -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Teachers do not have adequate support for using technology -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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 -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Collaborate in planning and preparing instructional materials -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Share what I have learned about my teaching experiences -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Visit another classroom to learn more about teaching ----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Work together to try out new ideas -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Work as a group on implementing the curriculum -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Work with teachers from other grades to ensure continuity in learning -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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
a) I am content with my profession as a teacher -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I am satisfied with being a teacher at this school -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I find my work full of meaning and purpose -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) I am enthusiastic about my job -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) My work inspires me -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) I am proud of the work I do ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) I am going to continue teaching for as long as I can ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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
a) There are too many students in the classes -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) I have too much material to cover in class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) I have too many teaching hours -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) I need more time to prepare for class -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) I need more time to assist individual students -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) I feel too much pressure from parents -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) I have difficulty keeping up with all of the changes to the curriculum -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) I have too many administrative tasks -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

About Teaching the TIMSS Class

12

How many students are in this class?

_____ students
Write in the number.

13

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

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

- a) Students lacking prerequisite mathematics knowledge or skills ----- — —
- b) Students suffering from lack of basic nutrition ----- — —
- c) Students suffering from not enough sleep ----- — —
- d) Students with physical disabilities ----- — —
- e) Students with mental, emotional, or psychological disabilities ----- — —

16

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

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.



- a) Inspiring students to learn physics ----- — — —
- b) Explaining physics concepts or principles by doing physics experiments ----- — — —
- c) Providing challenging tasks for the highest achieving students ----- — — —
- d) Adapting my teaching to engage students' interest ----- — — —
- e) Helping students appreciate the value of learning physics -- — — —
- f) Assessing student comprehension of physics ----- — — —
- g) Improving the understanding of struggling students ----- — — —
- h) Making physics relevant to students ----- — — —
- i) Developing students' higher-order thinking skills --- — — —
- j) Teaching physics using inquiry methods ----- — — —

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
a) Listen to me explain new physics content -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Observe natural phenomena and describe what they see ---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Watch me demonstrate an experiment, investigation, or simulation -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Design or plan experiments, investigations, or simulations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Conduct experiments, investigations, or simulations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Present data from experiments, investigations, or simulations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Interpret data from experiments, investigations, or simulations -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Use evidence from experiments, investigations, or simulations to support conclusions -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i) Read their textbooks or other resource materials -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j) Have students memorize facts and principles -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k) Use scientific formulas and laws to solve routine problems -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l) Do field work outside of class -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m) Take a written test or quiz -----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20

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

- a) Read the textbook or course materials in digital format ----- — — —
- b) Look up ideas and information ----- — — —
- c) Process and analyze data ----- — — —
- d) Draw graphs of functions ----- — — —
- e) Solve equations ----- — — —
- f) Manipulate algebraic expressions ----- — — —
- g) Conduct modeling and simulations ----- — — —
- h) Perform numerical integration ----- — — —
- i) Do scientific procedures or experiments ----- — — —

21

A. Does your school have a physics laboratory?

Check **one** circle only.

Yes ---

No ---

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

Check **one** circle only.

Yes ---

No ---

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

- a) Applying Newton's laws and laws of motion ----- — —
- b) Forces, including frictional force, acting on a body ----- — —
- c) Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time ----- — —
- d) The law of gravitation in relation to the movement of celestial objects ----- — —
- e) Kinetic and potential energy; conservation of mechanical energy ----- — —
- f) The law of conservation of momentum; elastic and inelastic collisions ----- — —
- g) The first law of thermodynamics ----- — —
- h) Heat transfer and specific heat capacities ----- — —
- i) The law of ideal gases; expansion of solids and liquids in relation to temperature change ----- — —

B. Electricity and Magnetism

- a) Electrostatic attraction or repulsion between isolated charged particles – Coulomb's law ----- — —
- b) Charged particles in an electric field ----- — —
- c) Electrical circuits; using Ohm's law and Joule's law ----- — —
- d) Charged particles in a magnetic field ----- — —
- e) Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction ----- — —
- f) Faraday's and Lenz's laws of induction ----- — —

C. Wave Phenomena and Atomic/Nuclear Physics

- a) Mechanical waves; the relationship between speed, frequency, and wavelength ----- — —
- b) Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays) ----- — —
- c) Thermal radiation, temperature, and wavelength ----- — —
- d) Reflection, refraction, interference, and diffraction ----- — —
- e) The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons ----- — —
- 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 ----- — —
- g) Mass-energy equivalence in nuclear reactions and particle transformations ----- — —

23

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.



- a) Doing problem/question sets - — —
- b) Reading the textbook ----- — —
- c) Memorizing formulas
and procedures ----- — —
- d) Gathering, analyzing, and
reporting data ----- — —
- e) Finding one or more applications
of the content covered ----- — —
- 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.



- 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 ----- — —

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 |
|--|-----------------------|-----------------------|
| a) Physics content | <input type="radio"/> | <input type="radio"/> |
| b) Physics pedagogy/instruction | <input type="radio"/> | <input type="radio"/> |
| c) Physics curriculum | <input type="radio"/> | <input type="radio"/> |
| d) Integrating information technology into physics | <input type="radio"/> | <input type="radio"/> |
| e) Improving students' critical thinking or inquiry skills | <input type="radio"/> | <input type="radio"/> |
| f) Physics assessment | <input type="radio"/> | <input type="radio"/> |
| g) Addressing individual students' needs | <input type="radio"/> | <input type="radio"/> |

25

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

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>?

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>?

Check **one** circle only.

- Yes ---
- No ---

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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 | <input type="radio"/> | <input type="radio"/> |
| b) I gave a presentation at a workshop or conference | <input type="radio"/> | <input type="radio"/> |
| c) I took part in an innovative project for curriculum and instruction | <input type="radio"/> | <input type="radio"/> |

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

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for the Evaluation of
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