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.
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 --------------------------- ○ ○

b) Physics ------------------------------- ○ ○

c) Biology ------------------------------- ○ ○

d) Chemistry ----------------------------- ○ ○

e) <Earth Science> ----------------------- ○ ○

f) Engineering --------------------------- ○ ○

g) Education—Mathematics --------------- ○ ○

h) Education—Physics ------------------- ○ ○

i) Education—Science -------------------- ○ ○

j) Education—General ------------------- ○ ○

k) Other ------------------------------- ○ ○
6 How much do you agree with these statements about advanced mathematics and physics education within your school?

Check one circle for each line.

<table>
<thead>
<tr>
<th>Agree a lot</th>
<th>Agree a little</th>
<th>Disagree a little</th>
<th>Disagree a lot</th>
</tr>
</thead>
</table>

a) The school encourages students to study advanced mathematics and physics

b) The school promotes professional development for teachers of advanced mathematics and physics

c) The school provides students with information about career options in advanced mathematics and physics

d) Advanced mathematics and physics teachers are admired by other teachers in the school

e) Teachers have high expectations for student achievement in advanced mathematics and physics

f) Students at this school respect students who excel in advanced mathematics and physics

g) Parents expect their children to study advanced mathematics and physics

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.

<table>
<thead>
<tr>
<th>Agree a lot</th>
<th>Agree a little</th>
<th>Disagree a little</th>
<th>Disagree a lot</th>
</tr>
</thead>
</table>

a) This school is located in a safe neighborhood

b) I feel safe at this school

c) This school’s security policies and practices are sufficient

d) The students behave in an orderly manner

e) The students are respectful of the teachers

f) The students respect school property

g) This school has clear rules about student conduct

h) This school’s rules are enforced in a fair and consistent manner
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

b) Teachers do not have adequate workspace (e.g., for preparation, collaboration, or meeting with students)

c) Teachers do not have adequate instructional materials and supplies

d) The school classrooms are not cleaned often enough

e) The school classrooms need maintenance work

f) Teachers do not have adequate technological resources

g) Teachers do not have adequate support for using technology

About Being a Teacher

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

b) Collaborate in planning and preparing instructional materials

c) Share what I have learned about my teaching experiences

d) Visit another classroom to learn more about teaching

e) Work together to try out new ideas

f) Work as a group on implementing the curriculum

g) Work with teachers from other grades to ensure continuity in learning
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
b) I am satisfied with being a teacher at this school
c) I find my work full of meaning and purpose
d) I am enthusiastic about my job
e) My work inspires me
f) I am proud of the work I do
g) I am going to continue teaching for as long as I can

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
b) I have too much material to cover in class
c) I have too many teaching hours
d) I need more time to prepare for class
e) I need more time to assist individual students
f) I feel too much pressure from parents
g) I have difficulty keeping up with all of the changes to the curriculum
h) I have too many administrative tasks
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

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.

<table>
<thead>
<tr>
<th>Confidence Level</th>
<th>a) Inspiring students to learn physics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very high</td>
<td>A A A A</td>
</tr>
<tr>
<td>High</td>
<td>A A A</td>
</tr>
<tr>
<td>Medium</td>
<td>A A</td>
</tr>
<tr>
<td>Low</td>
<td>A</td>
</tr>
</tbody>
</table>

  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
   ○ ○ ○ ○

b) Observe natural phenomena and describe what they see
   ○ ○ ○ ○

c) Watch me demonstrate an experiment, investigation, or simulation
   ○ ○ ○ ○

d) Design or plan experiments, investigations, or simulations
   ○ ○ ○ ○

e) Conduct experiments, investigations, or simulations
   ○ ○ ○ ○

f) Present data from experiments, investigations, or simulations
   ○ ○ ○ ○

g) Interpret data from experiments, investigations, or simulations
   ○ ○ ○ ○

h) Use evidence from experiments, investigations, or simulations to support conclusions
   ○ ○ ○ ○

i) Read their textbooks or other resource materials
   ○ ○ ○ ○

j) Have students memorize facts and principles
   ○ ○ ○ ○

k) Use scientific formulas and laws to solve routine problems
   ○ ○ ○ ○

l) Do field work outside of class
   ○ ○ ○ ○

m) Take a written test or quiz
   ○ ○ ○ ○
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.*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Every or almost every day</th>
<th>Once or twice a week</th>
<th>Once or twice a month</th>
<th>Never or almost never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Read the textbook or course materials in digital format</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>b) Look up ideas and information</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c) Process and analyze data</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d) Draw graphs of functions</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e) Solve equations</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>f) Manipulate algebraic expressions</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>g) Conduct modeling and simulations</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>h) Perform numerical integration</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>i) Do scientific procedures or experiments</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

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  ○
Physics Topics Taught to the TIMSS class

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.”

**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
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

<table>
<thead>
<tr>
<th>Kind of Homework</th>
<th>Always or almost always</th>
<th>Sometimes</th>
<th>Never or almost never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Doing problem/question sets</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>b) Reading the textbook</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c) Memorizing formulas and procedures</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d) Gathering, analyzing, and reporting data</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e) Finding one or more applications of the content covered</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>f) Working on projects</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Kind of Activity</th>
<th>Always or almost always</th>
<th>Sometimes</th>
<th>Never or almost never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Correct assignments and give feedback to students</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>b) Have students correct their own homework</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c) Discuss the homework in class</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d) Monitor whether or not the homework was completed</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e) Use the homework to contribute towards students’ grades or marks</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
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

a) Physics content

b) Physics pedagogy/instruction

c) Physics curriculum

d) Integrating information technology into physics

e) Improving students’ critical thinking or inquiry skills

f) Physics assessment

g) Addressing individual students’ needs

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?

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

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

b) I gave a presentation at a workshop or conference

c) I took part in an innovative project for curriculum and instruction
Thank you for the thought, time, and effort you have put into completing this questionnaire.
Teacher Questionnaire

Physics