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

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

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

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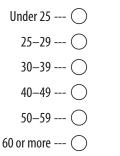
Are you female or male?

Check **one** circle only. Female ---- O Male ---- O

3

How old are you?

Check **one** circle only.



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What is the <u>highest</u> level of formal education you have completed?

Check one circle only.
Did not complete <tertiary> education 〇</tertiary>
(If you have not completed <tertiary> education, go to #6)</tertiary>
<short-cycle td="" tertiary<=""></short-cycle>

education—ISCED Level $5 > \dots$	
<bachelor's equivalent<br="" or="">level—ISCED Level 6> 〇</bachelor's>	
<master's <pre="" equivalent="" or="">level—ISCED Level 7> </master's>	

<Doctor or equivalent level—ISCED Level 8> --- 〇

5

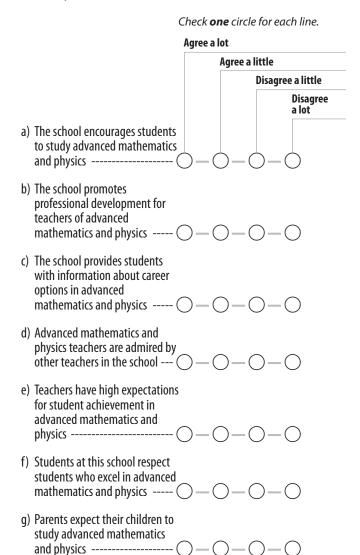
During your <post-secondary> education, what was your major or main area(s) of study?

	Yes
	No
a) Mathematics)-O
b) Physics ()-O
c) Biology ()-O
d) Chemistry)-O
e) <earth science=""> (</earth>)-O
f) Engineering ()-O
g) Education— Mathematics ()-O
h) Education— Physics ()-O
i) Education— Science ()-O
j) Education—General)-O
k) Other ()-O

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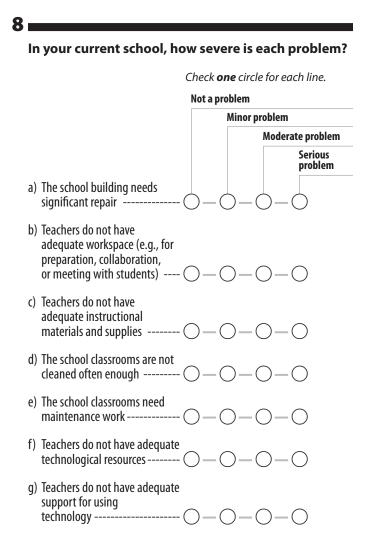
6

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

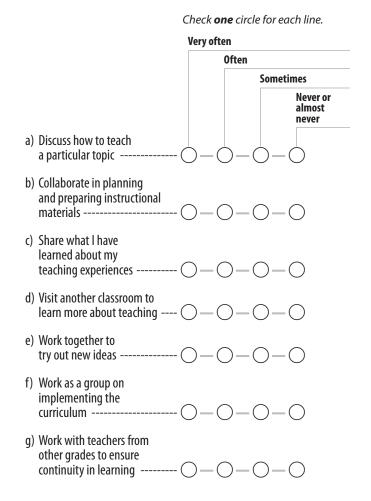


Thinking about your current school, indicate the extent to which you agree or disagree with each of the following statements.

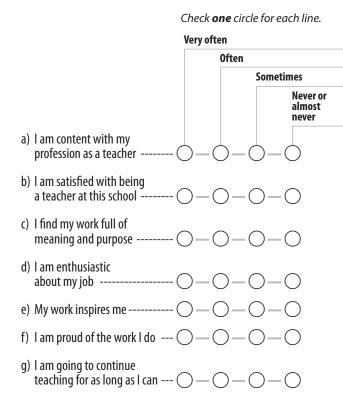
	Agree a lot
	Agree a little
	Disagree a little
	Disagree a lot
a) This school is located in a safe neighborhood	-0-0-0-0
b) I feel safe at this school	-0-0-0
c) This school's security policies and practices are sufficient	-0-0-0
d) The students behave in an orderly manner	-0-0-0
e) The students are respectful of the teachers	-0-0-0
f) The students respect school property	-0-0-0
g) This school has clear rules about student conduct	-0-0-0
h) This school's rules are enforced in a fair and consistent manner	-0-0-0



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

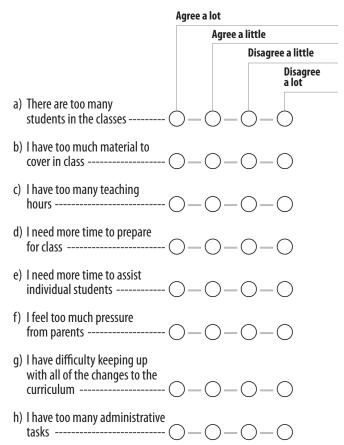


How often do you feel the following way about being a teacher?



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



How many students are in this class?

_____ students *Write in the number*.

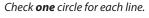
13

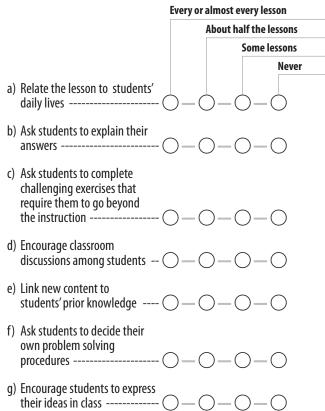
How many students in this class experience difficulties understanding <u>spoken</u> <language of test>?

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

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

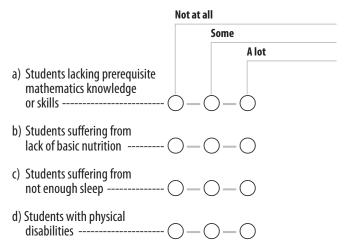




15

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

Check **one** circle for each line.



e) Students with mental, emotional, or psychological disabilities ----- **16** I

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.

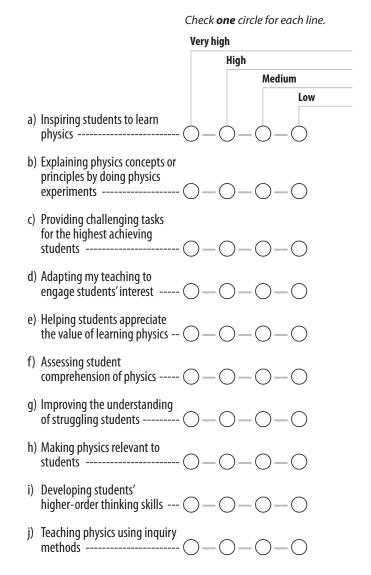
17 I

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.

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



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	0-0-0-0
c) Watch me demonstrate an experiment, investigation, or simulation	0-0-0-0
d) Design or plan experiments, investigations, or simulations	0-0-0-0
e) Conduct experiments, investigations, or simulations	0-0-0-0
f) Present data from experiments investigations, or simulations	
g) Interpret data from experimen investigations, or simulations	ts, • • • • • • • • • • • • • • • • • • •
h) Use evidence from experiment investigations, or simulations to support conclusions	
i) Read their textbooks or other resource materials	0-0-0-0
j) Have students memorize facts and principles	0-0-0-0
 k) Use scientific formulas and law to solve routine problems 	
I) Do field work outside of class	-0-0-0
m) Take a written test or quiz	0-0-0-0



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)

lf Yes,	
B. How often do you have to following activities on co calculators, or smartpho lessons?	omputers, tablets,
	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	-0-0-0
b) Look up ideas and information	-0-0-0
c) Process and analyze data	-0-0-0
d) Draw graphs of functions	-0-0-0
e) Solve equations	-0-0-0
f) Manipulate algebraic expressions	-0-0-0
g) Conduct modeling and simulations	-0-0-0
h) Perform numerical integration	-0-0-0
i) Do scientific procedures or experiments	-0-0-0

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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?

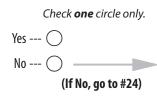


The following list includes the main topics addressed by the TIMSS Advanced physics test. Choose the response that best describes when the students in this class have been taught each topic. If a topic was in the curriculum before this year, please choose "Mostly taught before this year." If a topic 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."

	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	$-\dot{\bigcirc}-\dot{\bigcirc}-\dot{\bigcirc}$
b) Forces, including frictional force, acting on a body	-0-0-0
c) Forces acting on a body moving in a circular path; the body's centripetal acceleration, speed, and circling time	-0-0-0
d) The law of gravitation in relation to the movement of celestial objects	-0-0-0
e) Kinetic and potential energy; conservation of mechanical energy	-0-0-0
f) The law of conservation of momentum; elastic and inelastic collisions	-0-0-0
g) The first law of thermodynamics	-0-0-0
h) Heat transfer and specific heat capacities	-0-0-0
i) The law of ideal gases; expansion of solids and liquids in relation to temperature change	-0-0-0
B. Electricity and Magnetism	
a) Electrostatic attraction or repulsion between isolated charged particles – Coulomb's law	-0-0-0
b) Charged particles in an electric field	-0-0-0
c) Electrical circuits; using Ohm's law and Joule's law	-0-0-0
d) Charged particles in a magnetic field	-0-0-0
e) Relationship between magnetism and electricity; magnetic fields around electric conductors; electromagnetic induction	-0-0-0
f) Faraday's and Lenz's laws of induction	-0-0-0
C. Wave Phenomena and Atomic/Nuclear Physics	
a) Mechanical waves; the relationship between speed, frequency, and wavelength	-0-0-0
 b) Electromagnetic radiation; wavelength and frequency of various types of waves (radio, infrared, visible light, x-rays, gamma rays) 	-0-0-0
c) Thermal radiation, temperature, and wavelength	-0-0-0
d) Reflection, refraction, interference, and diffraction	-0-0-0
e) The structure of the atom and its nucleus; atomic number and atomic mass; electromagnetic emission and absorption and the behavior of electrons	-0-0-0
 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 	-0-0-0
	-0-0-0

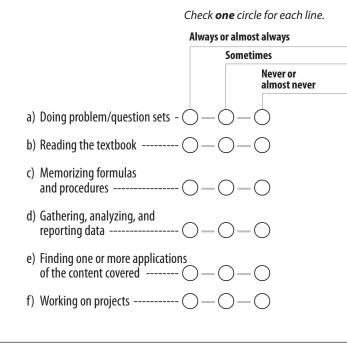


A. Do you assign physics homework to this class?

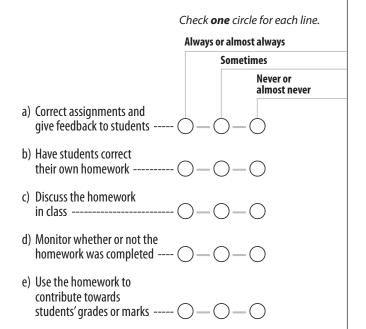




B. How often do you assign the following kinds of physics homework to this class?



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



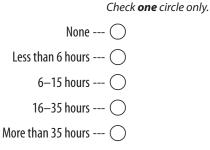


In the past two years, have you participated in professional development in any of the following?

Check one circle	for each line.
	Yes
	No
a) Physics content (D - O
b) Physics pedagogy/instruction)-O
c) Physics curriculum ()-O
d) Integrating information technology into physics ($\supset -\bigcirc$
e) Improving students' critical thinking or inquiry skills	$\supset -\bigcirc$
f) Physics assessment ()-O
g) Addressing individual students' needs ()-O

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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?



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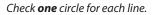
By the end of this school year, how many years will you have taught physics at the advanced level?

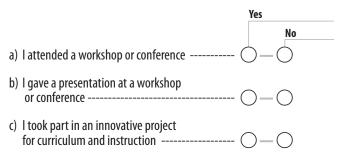
_____ years Number of years taught physics

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	a member of <professional ation for physics teachers>?</professional
	Check one circle only.
	Yes 🔿
	No 🔘
particip	ast two years, have you regularly bated in activities sponsored by ssional 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?





Thank You

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





TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

Teacher Questionnaire Physics



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