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TIMSS
Advanced
2015

TIMSS Advanced 2015 Curriculum Questionnaire— Physics



Physics



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

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TIMSS Advanced 2015 Curriculum Questionnaire

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TIMSS Advanced - 2015 - English
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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

[Table of Contents](#)

Next

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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.

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](#)

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](#)

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:

[Previous](#)

1/13 [Table of Contents](#)

[Next](#)

Criteria for Admission

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](#)

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

Check **one** circle only.

- Yes
 No

If Yes...
Please explain:

[Previous](#)

2/13 [Table of Contents](#)

[Next](#)

Physics Curriculum

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.

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](#)

Comments:

(Continued on Next Page)

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:

If No...
Comments:

[Previous](#)

3/13 [Table of Contents](#)

[Next](#)

TIMSS Advanced - 2015 - English
You are logged in as: 9911 [Logout](#)

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

Instructional Materials and Use of Technology

4. Is there a process for approving the physics instructional materials?

Check *one circle only*.

- Yes
 No

If Yes...

Please describe the process, and what materials (e.g., textbooks, workbooks, online materials) must be approved through this process:

[Previous](#)

4/13 [Table of Contents](#)

[Next](#)

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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?

Comments:

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?

Comments:

[Previous](#)

5/13 [Table of Contents](#)

[Next](#)

Examinations

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

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](#)

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](#)

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](#)

[Previous](#)

6/13 [Table of Contents](#)

[Next](#)

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

Comments:

[Previous](#)

7/13 [Table of Contents](#)

[Next](#)

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

Comments:

[Previous](#)

8/13 [Table of Contents](#)

[Next](#)

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

Comments:

[Previous](#)

9/13 [Table of Contents](#)

[Next](#)

TIMSS Advanced - 2015 - English
You are logged in as: 9911 [Logout](#)

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	<input type="radio"/>	<input type="radio"/>
b) Research programs	<input type="radio"/>	<input type="radio"/>
c) School self-evaluation	<input type="radio"/>	<input type="radio"/>
d) National or regional examinations	<input type="radio"/>	<input type="radio"/>
e) Other Please specify below:	<input type="radio"/>	<input type="radio"/>

Comments:

[Previous](#)

10/13 [Table of Contents](#)

[Next](#)

Recruitment to TIMSS Advanced Programs/Tracks

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	<input type="radio"/>	<input type="radio"/>
b) School collaborations with universities	<input type="radio"/>	<input type="radio"/>
c) Contests/competitions in physics	<input type="radio"/>	<input type="radio"/>
d) Other	<input type="radio"/>	<input type="radio"/>

Please specify:

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

[Previous](#)

11/13 [Table of Contents](#)

[Next](#)

TIMSS Advanced - 2015 - English
You are logged in as: 9911 [Logout](#)

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.

[Previous](#)

12/13 [Table of Contents](#)

[Next](#)

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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:

[Previous](#)

13/13 [Table of Contents](#)

[Next](#)

TIMSS Advanced - 2015 - English
You are logged in as: 9911 [Logout](#)

TIMSS Advanced 2015 Curriculum Questionnaire – Physics

This completes the TIMSS Advanced 2015 Curriculum Questionnaire - Physics Module

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[Previous](#)

[Table of Contents](#)

[Finish](#)

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