

Identification Label _____

Teacher Name: _____

Class Name: _____

Teacher ID: _____ Teacher Link # _____

Trends in International Mathematics and Science Study

TIMSS 2007



Teacher Questionnaire

SCIENCE
<Grade 8>

<TIMSS National Research Center Name>

<Address>



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General Directions

Your school has agreed to participate in TIMSS 2007, a large international study of student learning in mathematics and science in more than 60 countries around the world. Sponsored by the International Association for the Evaluation of Educational Achievement (IEA), TIMSS (for Trends in International Mathematics and Science Study) is measuring trends in student achievement and studying differences in national education systems in order to help improve the teaching and learning of mathematics and science worldwide.

As part of the study, students in a nationwide sample of <eighth-grade> classes in <country> will complete the TIMSS mathematics and science tests. This questionnaire is addressed to teachers who teach science to these students, and seeks information about teachers' academic and professional background, instructional practices, and attitudes toward teaching science. As a teacher of science to students in one of these sampled classes, your responses to these questions are very important in helping to describe science education in <country>.

Some of the questions in this questionnaire refer specifically to students in the "TIMSS class." This is the class that is identified on the cover of this questionnaire, and that will be tested as part of TIMSS 2007 in your school. If you teach science to some but not all of the students in the TIMSS class, please think of teaching the science class these students are in when answering these 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.

Please identify a time and place where you will be able to complete this questionnaire without being interrupted. This should require no more than 45 minutes. To make it as easy as possible for you to respond, most questions may be answered simply by checking or filling in the appropriate circle.

Once you have completed the questionnaire, place it in the return envelope provided and return it to: <Country Specific Information>

Thank you very much for the time and effort you have put into responding to this questionnaire.

Background Information

1 _____

How old are you?

Fill in **one** circle only

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

2 _____

Are you female or male?

Fill in **one** circle only

- Female -----○
Male -----○

3 _____

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

Number of years you have taught

Preparation to Teach

4 _____

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

Fill in **one** circle only

- Did not complete <ISCED 3> -----○
Finished <ISCED 3> -----○
Finished <ISCED 4> -----○
Finished <ISCED 5B> -----○
Finished <ISCED 5A, first degree> -----○
Finished <ISCED 5A, second degree> or higher -----○

5 _____

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

Fill in **one** circle for each row

- | | Yes | No |
|-----------------------------------|-----|----|
| a) Biology -----○ | ○ | ○ |
| b) Physics -----○ | ○ | ○ |
| c) Chemistry -----○ | ○ | ○ |
| d) <Earth Science> -----○ | ○ | ○ |
| e) Education - Science -----○ | ○ | ○ |
| f) Mathematics -----○ | ○ | ○ |
| g) Education - Mathematics -----○ | ○ | ○ |
| h) Education - General -----○ | ○ | ○ |
| i) Other -----○ | ○ | ○ |

6 _____

Do you have a teaching license or certificate?

Yes No

Fill in **one** circle only -----○

Preparation to Teach (Continued)

7

How well prepared do you feel you are to teach the following topics?

Fill in **one** circle for each row

Not well prepared				
Somewhat prepared				
Very well prepared				
Not applicable				

A. Biology

- a) Major organs and organ systems in humans and other organisms (structure/function, life processes that maintain stable bodily conditions) ----- -- -- --
- b) Cells and their functions, including respiration and photosynthesis as cellular processes --- -- -- --
- c) Reproduction (sexual and asexual) and heredity (passing on of traits, inherited versus acquired/learned characteristics) ----- -- -- --
- d) Role of variation and adaptation in survival/extinction of species in a changing environment ----- -- -- --
- e) Interaction of living organisms and the physical environment in an ecosystem (energy flow, food webs, effect of changes, cycling of materials) ----- -- -- --
- f) Trends in human population and its effects on the environment ----- -- -- --
- g) Impact of natural hazards on humans, wildlife, and the environment ----- -- -- --

B. Chemistry

- a) Classification and composition of matter (properties of elements, compounds, mixtures)--- -- -- --
- b) Particulate structure of matter (molecules, atoms, protons, neutrons, and electrons)----- -- -- --
- c) Solutions (solvent, solute, concentration/dilution, effect of temperature on solubility)----- -- -- --
- d) Properties and uses of common acids and bases----- -- -- --
- e) Chemical change (transformation of reactants, evidence of chemical change, conservation of matter, common oxidation reactions - combustion and rusting) ----- -- -- --

C. Physics

- a) Physical states and changes in matter (explanations of properties in terms of movement/distance between particles; phase change, thermal expansion and changes in volume and/or pressure) ----- -- -- --
- b) Energy forms, transformations, heat, and temperature ----- -- -- --
- c) Basic properties/behaviors of light (reflection, refraction, light and color, simple ray diagrams) and sound (transmission through media, loudness, pitch, amplitude, frequency, relative speed of light and sound) ----- -- -- --
- d) Electric circuits (flow of current; types of circuits - parallel/series; current/voltage relationship)----- -- -- --
- e) Properties of permanent magnets and electromagnets ----- -- -- --
- f) Forces and motion (types of forces, basic description of motion, use of distance/time graphs, effects of density and pressure) ----- -- -- --

7 Continued

How well prepared do you feel you are to teach the following topics?

Fill in **one** circle for each row

	Not well prepared	Somewhat prepared	Very well prepared	Not applicable
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

D. Earth Science

- a) Earth's structure and physical features (Earth's crust, mantle and core; use of topographic maps) ----- -- -- --
- b) Earth's processes, cycles and history (rock cycle; water cycle; weather patterns; major geological events; formation of fossils and fossil fuels) ----- -- -- --
- c) Environmental concerns (e.g., pollution, global warming, acid rain) ----- -- -- --
- d) Use and conservation of Earth's natural resources (renewable/non-renewable resources, human use of land/soil and water resources) ----- -- -- --
- e) Earth in the solar system and the universe (phenomena on Earth - day/night, tides, phases of moon, eclipses, seasons; physical features of Earth compared to other bodies; the Sun as a star) ----- -- -- --

8

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

Fill in **one** circle for each row

Daily or almost daily
1-3 times per week
2 or 3 times per month
Never or almost never

- a) Discussions about how to teach a particular concept -- ○ -- ○ -- ○ -- ○
- b) Working on preparing instructional materials ----- ○ -- ○ -- ○ -- ○
- c) Visits to another teacher's classroom to observe his/her teaching ----- ○ -- ○ -- ○ -- ○
- d) Informal observations of **my** classroom by another teacher ----- ○ -- ○ -- ○ -- ○

9

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

Fill in **one** circle for each row

No
Yes

- a) Science content ----- ○ -- ○
- b) Science pedagogy/instruction ----- ○ -- ○
- c) Science curriculum----- ○ -- ○
- d) Integrating information technology into science----- ○ -- ○
- e) Improving students' critical thinking or inquiry skills ----- ○ -- ○
- f) Science assessment ----- ○ -- ○

10

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

Fill in **one** circle for each row

Disagree a lot
Disagree
Agree
Agree a lot

- 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 - ○ -- ○ -- ○ -- ○

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In your current school, how severe is each problem?

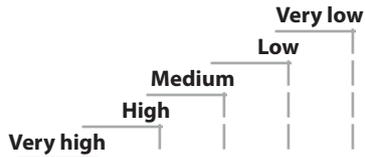
Fill in **one** circle for each row

Serious problem
Minor problem
Not a problem

- a) The school building needs significant repair----- ○ -- ○ -- ○
- b) Classrooms are overcrowded----- ○ -- ○ -- ○
- c) Teachers do not have adequate workspace outside their classroom ----- ○ -- ○ -- ○
- d) Materials are not available to conduct science experiments or investigations----- ○ -- ○ -- ○

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

Fill in **one** circle for each row



- a) Teachers' job satisfaction ----- ○ -- ○ -- ○ -- ○ -- ○
- b) Teachers' understanding of the school's curricular goals ----- ○ -- ○ -- ○ -- ○ -- ○
- c) Teachers' degree of success in implementing the school's curriculum ○ -- ○ -- ○ -- ○ -- ○
- d) Teachers' expectations for student achievement ----- ○ -- ○ -- ○ -- ○ -- ○
- e) Parental support for student achievement - ○ -- ○ -- ○ -- ○ -- ○
- f) Parental involvement in school activities --- ○ -- ○ -- ○ -- ○ -- ○
- g) Students' regard for school property ----- ○ -- ○ -- ○ -- ○ -- ○
- h) Students' desire to do well in school ----- ○ -- ○ -- ○ -- ○ -- ○



The TIMSS Class

The remaining questions refer to the <TIMSS class / class with the TIMSS students>. Remember, "the TIMSS class" is the class which is identified on the cover of this questionnaire, and which will be tested as part of TIMSS 2007 in your school.

13 _____
How many students are in the <TIMSS class/ class with the TIMSS students>?

_____ *Write in the number of students*

14 _____
How many minutes per week do you teach science to the <TIMSS class>?

_____ *Write in the number of minutes per week*

15 _____
A. Do you use a textbook(s) in teaching science to the <TIMSS class>?

_____ *Fill in **one** circle only* ----- Yes No

*If **No**, please go to question **16*** 

B. How do you use a textbook(s) in teaching science to the <TIMSS class>?

*Fill in **one** circle only*

As the primary basis for my lessons -----

As a supplementary resource -----

16 _____
In a typical week of science lessons for the <TIMSS class>, what percentage of time do students spend on each of the following activities?

*Write in the percent
 The total should add to 100%*

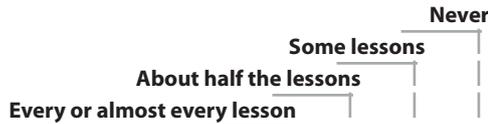
- a) Reviewing homework ----- %
- b) Listening to lecture-style presentations ----- %
- c) Working problems with your guidance ----- %
- d) Working problems on their own without your guidance ----- %
- e) Listening to you re-teach and clarify content/procedures ----- %
- f) Taking tests or quizzes ----- %
- g) Participating in classroom management tasks not related to the lesson's content/purpose (e.g., interruptions and keeping order) ----- %
- h) Other student activities ----- %
- Total** ----- 100%

Teaching Science to the TIMSS Class

17

In teaching science to the students in the <TIMSS class>, how often do you usually ask them to do the following?

Fill in **one** circle for each row

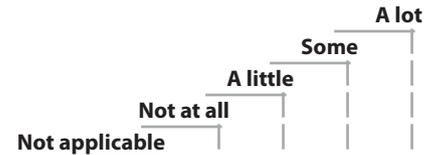


- a) Observe natural phenomena and describe what they see ----- ○ -- ○ -- ○ -- ○
- b) Watch me demonstrate an experiment or investigation ----- ○ -- ○ -- ○ -- ○
- c) Design or plan experiments or investigations ----- ○ -- ○ -- ○ -- ○
- d) Conduct experiments or investigations ----- ○ -- ○ -- ○ -- ○
- e) Work together in small groups on experiments or investigations ----- ○ -- ○ -- ○ -- ○
- f) Read their textbooks or other resource materials --- ○ -- ○ -- ○ -- ○
- g) Have students memorize facts and principles ----- ○ -- ○ -- ○ -- ○
- h) Use scientific formulae and laws to solve routine problems----- ○ -- ○ -- ○ -- ○
- i) Give explanations about something they are studying ----- ○ -- ○ -- ○ -- ○
- j) Relate what they are learning in science to their daily lives ----- ○ -- ○ -- ○ -- ○

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

Fill in **one** circle for each row



Students

- a) Students with different academic abilities----- ○ -- ○ -- ○ -- ○
- b) Students who come from a wide range of backgrounds (e.g., economic, language) - ○ -- ○ -- ○ -- ○
- c) Students with special needs (e.g., hearing, vision, speech impairment, physical disabilities, mental or emotional/psychological impairment) ----- ○ -- ○ -- ○ -- ○
- d) Uninterested students ○ -- ○ -- ○ -- ○
- e) Disruptive students -- ○ -- ○ -- ○ -- ○

Resources

- f) Shortage of computer hardware -- ○ -- ○ -- ○ -- ○
- g) Shortage of computer software--- ○ -- ○ -- ○ -- ○
- h) Shortage of support for using computers-- ○ -- ○ -- ○ -- ○
- i) Shortage of textbooks for student use ----- ○ -- ○ -- ○ -- ○
- j) Shortage of other instructional equipment for students' use ----- ○ -- ○ -- ○ -- ○
- k) Shortage of equipment for your use in demonstrations and other exercises -- ○ -- ○ -- ○ -- ○
- l) Inadequate physical facilities----- ○ -- ○ -- ○ -- ○
- m) High student/teacher ratio----- ○ -- ○ -- ○ -- ○

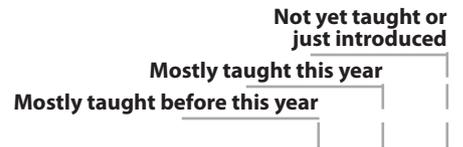
By the end of this school year, approximately what percentage of teaching time will you have spent during this school year on each of the following science content areas for the <TIMSS class>?

*Write in the percent
The total should add to 100%*

- a) Biology (e.g., structure/function; life processes, reproduction/heredity, natural selection; ecosystems, human health) ----- _____ %
- b) Chemistry (e.g., classification, composition and properties of matter; chemical change) ----- _____ %
- c) Physics (e.g., physical states/ changes in matter; energy; light; sound; electricity and magnetism; forces and motion) ----- _____ %
- d) Earth science (e.g., Earth's structure, processes, and resources; the solar system and universe) ----- _____ %
- e) Other, please specify:
_____ ----- _____ %
- Total** ----- 100%

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the <TIMSS class> have been taught each topic. 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."

Fill in **one** circle for each row



A. Biology

- a) Classification of organisms on the basis of a variety of physical and behavioral characteristics ----- ○ -- ○ -- ○
- b) Major organ systems in humans and other organisms ----- ○ -- ○ -- ○
- c) How the systems function to maintain stable bodily conditions ----- ○ -- ○ -- ○
- d) Cell structures and functions ----- ○ -- ○ -- ○
- e) Photosynthesis and respiration (including substances used and produced) as processes of cells and organisms ----- ○ -- ○ -- ○
- f) Life cycles of organisms, including humans, plants, birds, insects ----- ○ -- ○ -- ○
- g) Reproduction (sexual and asexual), and heredity (passing on of traits, inherited versus acquired/learned characteristics)----- ○ -- ○ -- ○
- h) Role of variation and adaptation in survival/extinction of species in a changing environment ----- ○ -- ○ -- ○
- i) Interaction of living organisms in an ecosystem (energy flow, food chains and food webs, food pyramids, and the effects of change upon the system)----- ○ -- ○ -- ○
- j) Cycling of materials in nature (water, carbon/oxygen cycle, decomposition of organisms) ----- ○ -- ○ -- ○
- k) Trends in human population and its effects on the environment ----- ○ -- ○ -- ○
- l) Impact of natural hazards on humans, wildlife, and the environment ----- ○ -- ○ -- ○
- m) Causes of common infectious diseases, methods of infection/transmission, prevention, and the body's natural resistance and healing capabilities ----- ○ -- ○ -- ○
- n) Preventive medicine methods (diet, hygiene, exercise, and lifestyle) ----- ○ -- ○ -- ○



20 Continued

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the <TIMSS class> have been taught each topic. 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."

Fill in **one** circle for each row

	Not yet taught or just introduced		
	Mostly taught this year		
	Mostly taught before this year		

B. Chemistry

- | | | | | | |
|--|---|----|---|----|---|
| a) Classification and composition of matter (physical and chemical properties, pure substances and mixtures, separation techniques) ----- | ○ | -- | ○ | -- | ○ |
| b) Particulate structure of matter (molecules, atoms, protons, neutrons, and electrons) ----- | ○ | -- | ○ | -- | ○ |
| c) Solutions (solvents, solutes, effect of temperature on solubility) ----- | ○ | -- | ○ | -- | ○ |
| d) Properties and uses of water (composition, melting/boiling points, changes in density/volume) ----- | ○ | -- | ○ | -- | ○ |
| e) Properties and uses of common acids and bases ----- | ○ | -- | ○ | -- | ○ |
| f) Chemical change (transformation of reactants, evidence of chemical change, conservation of matter) ----- | ○ | -- | ○ | -- | ○ |
| g) Common oxidation reactions (combustion, rusting), the need for oxygen and the relative tendency of familiar substances to undergo these reactions ----- | ○ | -- | ○ | -- | ○ |
| h) Classification of familiar chemical transformations as releasing or absorbing heat/energy ----- | ○ | -- | ○ | -- | ○ |

20 Continued

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the <TIMSS class> have been taught each topic. 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."

Fill in **one** circle for each row

	Mostly taught before this year	Mostly taught this year	Not yet taught or just introduced
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

C. Physics

- a) Physical states and changes in matter (explanations of properties including volume, shape, density, and compressibility in terms of movement/distance between particles, conservation of mass during physical changes) ----- -- --
- b) Processes of melting, freezing, evaporation, and condensation (phase change; melting/boiling points; effects of pressure and purity of substances)----- -- --
- c) Energy forms, transformations, heat and temperature, including heat transfer ----- -- --
- d) Temperature changes related to changes in volume and/or pressure and to changes in movement or speed of particles ----- -- --
- e) Basic properties/behavior of light (reflection, refraction, light and color, simple ray diagrams) ---- -- --
- f) Properties of sound (transmission through media, ways of describing sound (loudness, pitch, amplitude, frequency), relative speed) ----- -- --
- g) Electric circuits (flow of current, types of circuits – parallel/series) and relationship between voltage and current ----- -- --
- h) Properties of permanent magnets and electromagnets ----- -- --
- i) Forces and motion (types of forces, basic description of motion), use of distance/time graphs ----- -- --
- j) Effects of density and pressure ----- -- --



20 Continued

The following list includes the main topics addressed by the TIMSS science test. Choose the response that best describes when students in the <TIMSS class> have been taught each topic. 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."

Fill in **one** circle for each row

**Not yet taught or
just introduced**
Mostly taught this year
Mostly taught before this year

D. Earth Science

- | | | | |
|--|---|---|---|
| | ○ | ○ | ○ |
| a) Earth's structure and physical features
(Earth's crust, mantle, and core; topographic maps) ----- | ○ | ○ | ○ |
| b) The physical state, movement, composition, and relative distribution of water on Earth ----- | ○ | ○ | ○ |
| c) Earth's atmosphere and the relative abundance of its main components ----- | ○ | ○ | ○ |
| d) Earth's water cycle (steps, role of sun's energy, circulation/renewal of fresh water) ----- | ○ | ○ | ○ |
| e) Processes in the rock cycle and the formation of igneous, metamorphic,
and sedimentary rock ----- | ○ | ○ | ○ |
| f) Weather data/maps and changes in weather patterns
(e.g., seasonal changes, effects of latitude, altitude, and geography) ----- | ○ | ○ | ○ |
| g) Geological processes occurring over millions of years
(e.g., erosion, mountain building, plate movement) ----- | ○ | ○ | ○ |
| h) Formation of fossils and fossil fuels ----- | ○ | ○ | ○ |
| i) Environmental concerns (e.g., pollution, global warming, acid rain)----- | ○ | ○ | ○ |
| j) Earth's resources (renewable/nonrenewable, conservation, waste management)----- | ○ | ○ | ○ |
| k) Relationship of land management (e.g., pest control) to human use (e.g., farming) ----- | ○ | ○ | ○ |
| l) Supply and demand of fresh water resources----- | ○ | ○ | ○ |
| m) Explanation of phenomena on Earth based on position/movement of bodies in the
solar system and universe (e.g., day/night, tides, year, phases of the moon,
eclipses, seasons, appearance of sun, moon, planets, and constellations) ----- | ○ | ○ | ○ |
| n) Physical features of Earth compared with the moon and other planets
(e.g., atmosphere, temperature, water, distance from sun, period of revolution/rotation,
ability to support life)----- | ○ | ○ | ○ |

Computers in the TIMSS Class

21

A. Do students in the <TIMSS class> have computer(s) available to use during their science lessons?

No
 Yes

Fill in **one** circle only ----- ○ --- ○

If **No**, please go to question **23** 

B. Do any of the computer(s) have access to the Internet?

No
 Yes

Fill in **one** circle only ----- ○ --- ○

22

In teaching science to the <TIMSS class>, how often do you have students use a computer for the following activities?

Fill in **one** circle for each row

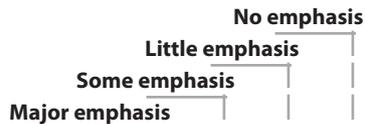
		Never
Every or almost every lesson	About half the lessons	Some lessons
a) Do scientific procedures or experiments -----	○	○
b) Study natural phenomena through simulations -----	○	○
c) Practice skills and procedures -----	○	○
d) Look up ideas and information -----	○	○
e) Process and analyze data -----	○	○



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How much emphasis do you place on the following sources to monitor students' progress in science?

Fill in **one** circle for each row



- a) Classroom tests (for example, teacher made or textbook tests) ----- ○ -- ○ -- ○ -- ○
- b) National or regional achievement tests ----- ○ -- ○ -- ○ -- ○
- c) Your professional judgement ----- ○ -- ○ -- ○ -- ○

29

How often do you give a science test or examination to the <TIMSS class>?

Fill in **one** circle only

- About once a week ----- ○
- About every two weeks ----- ○
- About once a month ----- ○
- A few times a year ----- ○
- Never ----- ○

If **Never**, you have completed the questionnaire

30

What item formats do you typically use in your science tests or examinations?

Fill in **one** circle only

- Only constructed-response ----- ○
- Mostly constructed-response ----- ○
- About half constructed-response and half objective (e.g., multiple-choice) ----- ○
- Mostly objective ----- ○
- Only objective ----- ○

31

How often do you include the following types of questions in your science tests or examinations?

Fill in **one** circle for each row



- a) Questions based on knowing facts and concepts ----- ○ -- ○ -- ○
- b) Questions based on the application of knowledge and understanding ----- ○ -- ○ -- ○
- c) Questions involving developing hypotheses and designing scientific investigations ----- ○ -- ○ -- ○
- d) Questions requiring explanations or justifications ----- ○ -- ○ -- ○

Thank You

for completing this questionnaire



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

Teacher Questionnaire

SCIENCE
<Grade 8>