

TIMSS 2007 Science Curriculum Questionnaire

Science Curriculum and Instruction in Middle/Lower Secondary Schools

1. Does your country have a national curriculum that covers science instruction at the eighth grade of formal schooling?

Check *one* circle only.

Yes---

No---

If No...

What is the highest level of decision-making authority (e.g., state or province) that provides a curriculum that covers science instruction at the eighth grade of formal schooling?

If Yes...

Comments:

2. What is the grade-to-grade structure of the middle/lower secondary school curriculum that covers science instruction (e.g., grades 1-8; grades 4-8; grades 6-8; grades 7-9)?

Comments:

3. By grade 8, are different science courses offered in separate subjects (e.g., biology, chemistry, physics, earth science)?

Check **one** circle only.

Yes---

No---

If Yes...

Please list the science subjects taught as separate courses and all grades in which they are taught, up to and including grade 8:

<u>Subject</u>	<u>Grades</u>
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

If No...

Comments:

4. In what year was the current science curriculum introduced?

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

5. Is the science curriculum currently being revised?

Check **one** circle only.

Yes---

No---

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

If Yes...

Please explain:

If No...

Comments:

6. What does the science curriculum prescribe?

Check **one** circle for each line.

	Yes	No
a) Goals and objectives-----	<input checked="" type="radio"/>	<input type="radio"/>
b) Processes or methods-----	<input checked="" type="radio"/>	<input type="radio"/>
c) Materials-----	<input checked="" type="radio"/>	<input type="radio"/>
d) Percentage of students reaching defined goals-----	<input checked="" type="radio"/>	<input type="radio"/>
e) Other-----	<input checked="" type="radio"/>	<input type="radio"/>
Please specify: _____		

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

7. Does the national curriculum contain statements/policies about the use of computers in grade 8 science?

Check **one** circle only.

Yes---

No---

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

If Yes...

What are the statements/policies?

If No...

Comments:

8. How much emphasis does the national science curriculum place on the following?

Check **one** circle for each line.

	None	Very Little	Some	A lot
a) Knowing basic science facts and principles-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b) Observing natural phenomena and describing what is seen-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c) Providing explanations about what is being studied-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d) Designing and planning experiments or investigations-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e) Conducting experiments or investigations-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f) Integrating science with other subjects-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g) Relating what students are learning to their daily lives-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h) Incorporating the experiences of different ethnic/cultural groups-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

9. According to the national science curriculum, what proportion of grade 8 students should have been taught each of the following topics or skills by the end of grade 8?

Across grades K-12, at what grade(s) are the topics primarily intended to be taught?

Be sure to include curriculum expectations for all grades up to and including grade 8. If there are not any specifications to this detail, please indicate national expectations to the best of your ability.

If part of a topic does not apply (e.g., heredity in part A topic (g)), please explain in the comment field.

	Proportion of grade 8 students expected to be taught topic			Grade(s) topic is expected to be taught K-12
	All or almost all students	Only the more able students (top track)	Not included in the curriculum through grade 8	
<i>Check one circle for each line.</i>				
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-----	○	○	○	_____

<p>g) Reproduction (sexual and asexual), and heredity (passing on of traits, inherited versus acquired/learned characteristics)-----</p>		<p>_____</p>
<p>h) Role of variation and adaptation in survival/extinction of species in a changing environment----</p>		<p>_____</p>
<p>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)-----</p>		<p>_____</p>
<p>j) Cycling of materials in nature (water, carbon/oxygen cycle, decomposition of organisms)</p>		<p>_____</p>
<p>k) Trends in human population and its effects on the environment-----</p>		<p>_____</p>
<p>l) Impact of natural hazards on humans, wildlife, and the environment-----</p>		<p>_____</p>
<p>m) Causes of common infectious diseases, methods of infection/transmission, prevention, and the body's natural resistance and healing capabilities-----</p>		<p>_____</p>
<p>n) Preventive medicine methods (diet, hygiene, exercise, and lifestyle)-----</p>		<p>_____</p>

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

	Proportion of grade 8 students expected to be taught topic			Grade(s) topic is expected to be taught K-12
	All or almost all students	Only the more able students (top track)	Not included in the curriculum through grade 8	
<i>Check one circle for each line.</i>				
B. Chemistry				
a) Classification and composition of matter (physical and chemical properties, pure substances and mixtures, separation techniques)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
b) Particulate structure of matter (molecules, atoms, protons, neutrons, and electrons)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
c) Solutions (solvents, solutes, effect of temperature on solubility)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
d) Properties and uses of water (composition, melting/boiling points, changes in density/volume)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
e) Properties and uses of common acids and bases-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
f) Chemical change (transformation of reactants, evidence of chemical change, conservation of matter)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
g) Common oxidation reactions (combustion, rusting), the need for oxygen and the relative tendency of familiar substances to undergo these reactions-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____

h) Classification of familiar chemical transformations as releasing or absorbing heat/energy-----



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Comments:

	Proportion of grade 8 students expected to be taught topic			Grade(s) topic is expected to be taught K-12
	All or almost all students	Only the more able students (top track)	Not included in the curriculum through grade 8	
<i>Check one circle for each line.</i>				
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)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
b) Processes of melting, freezing, evaporation, and condensation (phase change; melting/boiling points; effects of pressure and purity of substances)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
c) Energy forms, transformations, heat and temperature, including heat transfer-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
d) Temperature changes related to changes in volume and/or pressure and to changes in movement or speed of particles-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
e) Basic properties/behavior of light (reflection, refraction, light and color, simple ray diagrams)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____

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-----		_____

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Comments:

	Proportion of grade 8 students expected to be taught topic			Grade(s) topic is expected to be taught K-12
	All or almost all students	Only the more able students (top track)	Not included in the curriculum through grade 8	
D. Earth Science				
a) Earth's structure and physical features (Earth's crust, mantle, and core; topographic maps)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
b) The physical state, movement, composition, and relative distribution of water on Earth-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
c) Earth's atmosphere and the relative abundance of its main components-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
d) Earth's water cycle (steps, role of sun's energy, circulation/renewal of fresh water)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
e) Processes in the rock cycle and the formation of igneous, metamorphic, and sedimentary rock-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
f) Weather data/maps and changes in weather patterns (e.g., seasonal changes, effects of latitude, altitude, and geography)-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
g) Geological processes occurring over millions of years (e.g., erosion, mountain building, plate movement)----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____
h) Formation of fossils and fossil fuels-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	_____

Check *one* circle for each line.

<p>i) Environmental concerns (e.g., pollution, global warming, acid rain)-----</p>		<p>_____</p>
<p>j) Earth's resources (renewable/nonrenewable, conservation, waste management)-----</p>		<p>_____</p>
<p>k) Relationship of land management (e.g., pest control) to human use (e.g., farming)-----</p>		<p>_____</p>
<p>l) Supply and demand of fresh water resources-----</p>		<p>_____</p>
<p>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, appearances of sun, moon, planets, and constellations)----</p>		<p>_____</p>
<p>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)-----</p>		<p>_____</p>

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

10. Which best describes how the science curriculum addresses the issue of students with different levels of ability?

Please answer for students in regular classes, and explain provisions for special needs students in the comment box.

*Check **one** circle only.*

- The same curriculum is prescribed for all students-----
- The same curriculum is prescribed for students of different ability levels, but at different levels of difficulty-----
- Different curricula are prescribed for students of different ability levels--

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

11. In what form is the science curriculum made available?

Check **one** circle for each line.

	Yes	No
a) Official publication containing the curriculum-----	<input type="radio"/>	<input checked="" type="radio"/>
b) Ministry notes and directives-----	<input type="radio"/>	<input checked="" type="radio"/>
c) Mandated or recommended textbooks-----	<input type="radio"/>	<input checked="" type="radio"/>
d) Instructional or pedagogical guide-----	<input type="radio"/>	<input checked="" type="radio"/>
e) Specifically developed or recommended instructional activities----	<input type="radio"/>	<input checked="" type="radio"/>
f) Other-----	<input type="radio"/>	<input checked="" type="radio"/>

Please specify:

Refers to the national curriculum that covers science instruction at the eighth grade of formal schooling. If you do not have a national curriculum, please summarize for your state or provincial curricula.

Comments:

12. a) In a typical week, what is the total amount of instructional time prescribed by the curriculum at the eighth grade of formal schooling?

hours and minutes

- b) What percentage of total instructional time is supposed to be devoted to **science** instruction at the eighth grade of formal schooling?

% of total

Write in a number

Comments:

- c) Is there a policy to assign science homework at the eighth grade of formal schooling?

*Check **one** circle only.*

Yes---

No---

If Yes...

What is the policy?

If No...

Comments:

13. Is there an official policy to provide remedial science instruction at the eighth grade of formal schooling?

Check **one** circle only.

Yes---

No---

If Yes...

What is the policy?

If No...

Comments:

14. Which are the current requirements for being a middle/lower secondary grade teacher?

Check **one** circle for each line.

	Yes	No
a) A degree from a teacher education program-----	<input type="radio"/>	<input checked="" type="radio"/>
b) Pre-practicum during teacher education program-----	<input type="radio"/>	<input checked="" type="radio"/>
c) Supervised practicum in the field-----	<input type="radio"/>	<input checked="" type="radio"/>
d) Passing a certification examination-----	<input type="radio"/>	<input checked="" type="radio"/>
e) Completion of a probationary teaching period-----	<input type="radio"/>	<input checked="" type="radio"/>
<i>If Yes...</i> How long is this period? _____		
f) Completion of a mentoring or induction program-----	<input type="radio"/>	<input checked="" type="radio"/>
g) Other-----	<input type="radio"/>	<input checked="" type="radio"/>
Please specify: _____		

Refers to the requirements encompassing eighth grade.

Comments:

15. Is there a process to license or certify middle/lower secondary grade teachers?

Check **one** circle only.

Yes---

No---

Refers to the requirements encompassing eighth grade.

If Yes...

Who certifies/licenses middle/lower secondary grade teachers?

Check **one** circle for each line.

	Yes	No
a) Minister/Ministry of Education-----	<input checked="" type="radio"/>	<input type="radio"/>
b) National/state licensing board-----	<input type="radio"/>	<input checked="" type="radio"/>
c) Universities/colleges-----	<input type="radio"/>	<input checked="" type="radio"/>
d) Teacher organization/union-----	<input type="radio"/>	<input checked="" type="radio"/>
e) Other-----	<input type="radio"/>	<input checked="" type="radio"/>
Please specify: _____		

Comments:

If No...

Comments:

16. As part of pre-service education, do prospective teachers receive specific preparation in how to teach the science curriculum?

Check **one** circle only.

Yes---

No---

Comments:

17. How do practicing teachers get help to implement the science curriculum?

Check **one** circle for each line.

- | | Yes | No |
|---|-----------------------|-----------------------|
| a) In-service training----- | <input type="radio"/> | <input type="radio"/> |
| b) Expert teacher/mentor----- | <input type="radio"/> | <input type="radio"/> |
| c) Reduced teaching load for new teachers---- | <input type="radio"/> | <input type="radio"/> |
| d) Other----- | <input type="radio"/> | <input type="radio"/> |

Please specify:

Comments:

18. If changes were made to the science curriculum, how would a teacher learn about them?

Check **one** circle for each line.

	Yes	No
a) Special conferences/seminars on curriculum-----	<input type="radio"/>	<input checked="" type="radio"/>
b) Ministry (Department of Education, Government, Board of Education) Website-----	<input type="radio"/>	<input checked="" type="radio"/>
c) Printed copies of curriculum distributed to schools-----	<input type="radio"/>	<input checked="" type="radio"/>
d) Teachers receive own printed copy-----	<input type="radio"/>	<input checked="" type="radio"/>
e) Professional development/in-service education-----	<input type="radio"/>	<input checked="" type="radio"/>
f) Ministry Notes-----	<input type="radio"/>	<input checked="" type="radio"/>
g) Professional association newsletter-----	<input type="radio"/>	<input checked="" type="radio"/>
h) Education journals-----	<input type="radio"/>	<input checked="" type="radio"/>
i) Other educational authorities-----	<input type="radio"/>	<input checked="" type="radio"/>
j) Other-----	<input type="radio"/>	<input checked="" type="radio"/>

Please specify:

Comments:

19. How are parents informed about the science curriculum?

Check **one** circle for each line.

	Yes	No
a) From teachers-----	<input type="radio"/>	<input checked="" type="radio"/>
b) From the school administration-----	<input type="radio"/>	<input checked="" type="radio"/>
c) From public awareness campaigns-----	<input type="radio"/>	<input checked="" type="radio"/>
d) From Ministry Website-----	<input type="radio"/>	<input checked="" type="radio"/>
e) From Ministry brochures and documents-----	<input type="radio"/>	<input checked="" type="radio"/>
f) Through parents' associations/organizations----	<input type="radio"/>	<input checked="" type="radio"/>
g) Other-----	<input type="radio"/>	<input checked="" type="radio"/>
Please specify: _____		

Comments:

20. Is there a policy to encourage parental involvement in the schools attended by eighth-grade students?

Check **one** circle only.

Yes---

No---

If Yes...

What is the policy?

If No...

Comments:

21. How is the science curriculum implementation evaluated?

Check **one** circle for each line.

	Yes	No
a) Visits by inspectors-----	<input type="radio"/>	<input checked="" type="radio"/>
b) Research programs-----	<input type="radio"/>	<input checked="" type="radio"/>
c) School self-evaluation-----	<input type="radio"/>	<input checked="" type="radio"/>
d) National or regional assessments-----	<input type="radio"/>	<input checked="" type="radio"/>
e) Other-----	<input type="radio"/>	<input checked="" type="radio"/>
Please specify: _____		

Comments:

22. Across grades K-12, does an education authority in your country (e.g., National Ministry of Education) administer examinations in science that have consequences for individual students, such as determining grade promotion, entry to a higher school system, entry to a university, and/or exiting or graduating from high school?

Check **one** circle only.

Yes---

No---

If Yes...

Please describe the authority which administers examinations in science, and list the grades at which they are given:

If No...

Comments:

Addendum on Different Science Courses Offered for Students Tested in TIMSS 2007

If different science courses are offered in separate subjects, what percentage of total instructional time is supposed to be devoted to instruction in each science subject at the eighth grade of formal schooling?

(Please refer to question 12b)

Science Subject (e.g. biology, chemistry, physics, earth science)	Percentage of Total (Write in a number)
Biology	_____
Chemistry	_____
Physics	_____
Earth Science	_____

Comments:
