



Trends in International Mathematics and Science Study

TIMSS 2006/07

4

Year 5 - BOOKLET

MARKING GUIDE

Also contains proportions of students who gave correct answers for selected countries.

Compiled by the Research Division.



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This document is a companion to the test booklet and contains the guide used to code each of the questions along with the percentage of students who correctly answered for English-speaking and high-performing countries. It is arranged by question in the same order as the test booklet, with an indication of the question number and a brief description of the question.

Classification of items

The TIMSS 2007 Assessment Frameworks (Mullis, Martin, Ruddock, O’Sullivan, Arora, & Erberber, 2005) provided a template for the assessment of mathematics and science in TIMSS 2006/07. The mathematics framework for Year 5 students (grade 4) had 3 content domains: number, geometric shapes and measures, and data display. Similarly, the science framework had 3 content domains at this school level: life science, physical science, and earth science. These domains were used to classify questions and quantify content coverage of the test items. As well as the content classification, the framework also included the cognitive behaviours expected of students when they answer questions. For both mathematics and science, the cognitive domains were: knowing, applying, and reasoning.

Coding

TIMSS allows for more than one type of correctness code, with the first digit, either 1 or 2, indicating the number of points and the second digit indicating the category the answer fell into. For example if a student’s response is coded 11, it was awarded a score of 1 and the response fell mainly into category 11. Incorrect codes, starting with a 7, were given to answers that were wrong.

Percent correct

Thirty-seven countries participated in TIMSS 2006/07 at the Year 5 level. The results for selected countries are presented in each table. The table shows the percentage of students who correctly answered the question, and achieved the maximum number of points.

How this document can be used

This document needs to be read in reference to the test booklet. The test booklet may be given to students and can be coded in relation to the coding information presented in this booklet. Teachers can choose to use a selection of the items from the test booklet based on the item classification contained within this companion.

References:

Mullis, I.V.S., Martin, M.O., Ruddock, G.J., O’Sullivan, C.Y., Arora, A., & Erberber, E. (2005). *TIMSS 2007 assessment frameworks*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Boston College.

Question 1	Item Label:	Content Domain:	Cognitive Domain:
	Animal with an external skeleton	Life Science	Knowing
Code	Response	Item: S04_01	
Correct Response			
10	B		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Australia	72	England	67
United States	70	Netherlands	65
Russian Federation	70	Scotland	64
Singapore	69	New Zealand	56
Latvia	68	<i>International Mean</i>	<i>47</i>

Question 2	Item Label:	Content Domain:	Cognitive Domain:
	One way seeds are dispersed	Life Science	Knowing
Code	Response	Item: S04_02	
Correct Response			
10	Refers to wind OR water carrying the seeds away from the plant Examples: The seeds can be blown away by the wind. They are dispersed by wind. The wind. Seeds can drop into water and be carried to another place. The seeds can be carried by water. Water.		
11	Refers to organisms such as birds and mammals carrying the seeds away from the plant Examples: Animals eat the fruit and the seed is dropped far from the plant. Seeds can be dispersed by animals which catch the seeds in their fur. Animals such as birds. Grass seeds attach to humans and are carried away.		
19	Other correct Examples: Fruits explode scattering their seeds. Pods dry out and explode. The fruit bursts open. The fruit blows up. Explosive action. Explosion. The seeds pop out.		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task) Examples: The fall off the plant.		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Slovenia	67	Singapore	44
Netherlands	66	<i>International Mean</i>	40
Kazakhstan	65	New Zealand	39
United States	60	Australia	37
England	54	Scotland	35

Question 3	Item Label: Source of vitamins and minerals	Content Domain: Life Science	Cognitive Domain: Applying
Code	Response	Item: S04_03	
Correct Response			
10	A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Czech Republic	92	Australia	75
Italy	91	England	74
Austria	88	Scotland	72
Singapore	86	<i>International Mean</i>	70
New Zealand	81	United States	68

Question 4	Item Label:	Content Domain:	Cognitive Domain:
	Bird living and cloud nonliving	Life Science	Applying
Code	Response	Item: S04_04	
Note:	Accepted responses refer to: Growth/development Reproduction Respiration Intrinsic movement Nutrition Excretion Responding to stimuli		
Correct Response			
20	Refers to two accepted reasons indicated in the note above		
	Examples: A bird can lay eggs and breathes. A bird can move on its own. A bird eats. A cloud cannot move on its own. Clouds cannot eat. A bird fluffs up its feathers. A bird gets rid of its waste. A bird can hatch from an egg and a bird can die.		
Partially Correct Response			
10	Refers to one accepted reason indicated in the note above.		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
	Examples: Because a cloud is made of water vapour. A bird has a brain. A bird is on the ground, a cloud is in the sky. Because a cloud is not alive. A cloud cannot move.		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	57	<i>International Mean</i>	25
Kazakhstan	56	Australia	17
Italy	53	England	16
Russian Federation	45	Scotland	14
United States	30	New Zealand	13

Question 5	Item Label: Sunflower seed	Content Domain: Life Science	Cognitive Domain: Reasoning
Code	Response	Item: S04_05	
Correct Response			
10	Refers to Carl watering his plant and/or placing his plant in the sun (and/or Jan not doing so)		
	<p>Examples:</p> <p>Carl might have given it more light and water.</p> <p>Carl made sure the soil did not dry up.</p> <p>Maybe Carl gave more water to his plant while Jan gave less to her plant.</p> <p>Carl put his plant on a windowsill in the light.</p> <p>Jan did not give her plant enough sun or water.</p>		
11	Refers to Carl adding fertilizer/nutrients/plant food to his plant (and/or Jan not doing so)		
	<p>Examples:</p> <p>Carl may have used fertilizer.</p> <p>He added some nutrients to the plant.</p> <p>He might have given his sunflower plant food.</p> <p>He might have fed his plant every week and Jan may not have.</p> <p>Jan did not give her plant as much fertilizer.</p>		
19	Other correct		
	<p>Examples:</p> <p>He placed the plant in a warm place.</p>		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
	<p>Examples:</p> <p>Carl may have used better soil in his pot. (They used the same soil.)</p>		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	85	Slovenia	81
Lithuania	85	United States	78
Netherlands	84	New Zealand	77
Australia	83	Scotland	74
England	81	<i>International Mean</i>	<i>64</i>
Hong Kong	81		

Question 6	Item Label:	Content Domain:	Cognitive Domain:
	Three objects of same size and shape	Physical Science	Applying
Code	Response	Item: S04_06	
Correct Response			
10	B		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Russian Federation	92	Singapore	88
Chinese Taipei	91	Scotland	82
Germany	90	United States	80
Hong Kong	90	<i>International Mean</i>	80
Slovenia	90	Australia	68
England	89	New Zealand	67

Question 7	Item Label:	Content Domain:	Cognitive Domain:
	Which object moves due to gravity	Physical Science	Knowing
Code	Response	Item: S04_07	
Correct Response			
10	D		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong	73	Australia	57
Slovak Republic	71	New Zealand	56
Russian Federation	67	Singapore	55
England	62	Scotland	49
United States	61	<i>International Mean</i>	49

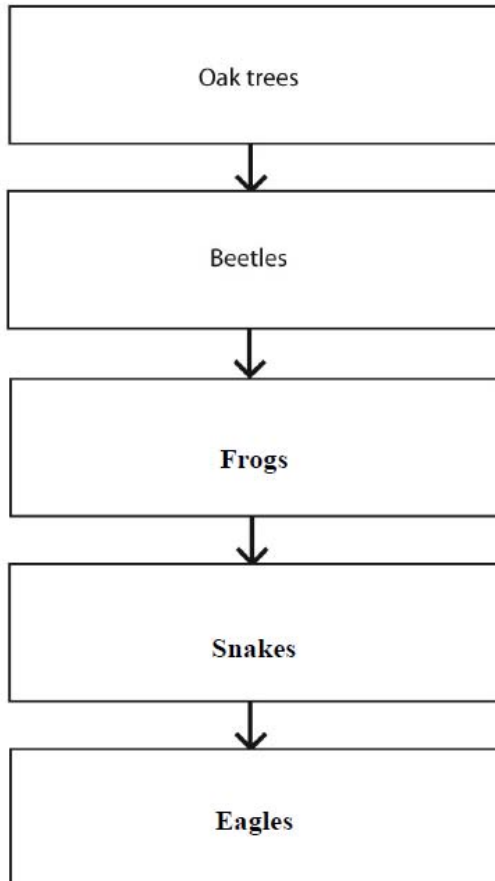
Question 8	Item Label: Complete the food chain	Content Domain: Life Science	Cognitive Domain: Reasoning
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Code	Response	Item: S04_08
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Correct Response

10

Correctly fills in the food chain based on information given in the table.

**Incorrect Response**

79

Incorrect (including crossed out/erased, stray marks, illegible, or off task)

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	72	England	45
Hong Kong	55	Australia	40
Russian Federation	54	Scotland	35
Japan	53	New Zealand	33
United States	49	<i>International Mean</i>	<i>31</i>

Question 9	Item Label: Proportions of land-water on Earth type	Content Domain: Earth Science	Cognitive Domain: Applying
Code	Response	Item: S04_09	
Correct Response			
10	A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong	74	<i>International Mean</i>	45
Kazakhstan	74	Australia	44
Lithuania	72	England	43
Singapore	61	Scotland	41
United States	55	New Zealand	35

Question 10	Item Label: Fossils of shellfish	Content Domain: Earth Science	Cognitive Domain: Applying
Code	Response	Item: S04_10	
Correct Response			
10	D		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Japan	77	United States	64
Chinese Taipei	74	New Zealand	62
Netherlands	71	Singapore	61
Australia	64	Scotland	58
England	64	<i>International Mean</i>	52

Question 11	Item Label: One property to separate balls	Content Domain: Physical Science	Cognitive Domain: Applying
Code	Response	Item: S04_11	
Correct Response			
10	Refers to colour and/or magnetism and/or weight/mass Examples: The balls look different colours. Colour. She could use a magnet. Some balls might be magnetic. The black balls may be attracted to a magnet. Magnetic/non-magnetic. Weigh them. They may have different masses. By weight.		
19	Other correct Examples: Shiny/non-shiny. Soft/hard.		
Incorrect Response			
70	Refers to volume or shape or size Examples: Same volume. She could use their shape. She could use their size.		
79	Other Incorrect (including crossed out/erased, stray marks, illegible, or off task) Examples: By using a scale.		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Kazakhstan	68	England	44
Czech Republic	67	<i>International Mean</i>	40
Russian Federation	65	Australia	37
Singapore	58	New Zealand	35
United States	52	Scotland	33

Question 12	Item Label: State of each group	Content Domain: Physical Science	Cognitive Domain: Applying												
Code	Response	Item: S04_12													
Correct Response															
10	The table is filled in correctly														
<table border="1"> <thead> <tr> <th>Group</th> <th>Matter</th> <th>State</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Water and juice</td> <td>Liquid</td> </tr> <tr> <td>2</td> <td>Air and oxygen</td> <td>Gas</td> </tr> <tr> <td>3</td> <td>Rock and gold</td> <td>Solid</td> </tr> </tbody> </table>				Group	Matter	State	1	Water and juice	Liquid	2	Air and oxygen	Gas	3	Rock and gold	Solid
Group	Matter	State													
1	Water and juice	Liquid													
2	Air and oxygen	Gas													
3	Rock and gold	Solid													
Incorrect Response															
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)														
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)												
Singapore	93	United States	66												
Hong Kong	91	Scotland	63												
Japan	77	Australia	57												
England	76	New Zealand	53												
Italy	72	<i>International Mean</i>	52												

Question 13	Item Label:	Content Domain:	Cognitive Domain:
	A natural resource and its use	Earth Science	Knowing
Code	Response	Item: S04_13	
Note:	i) Accepted natural resources and their uses include: <ol style="list-style-type: none"> 1) Resource: Air (oxygen, carbon dioxide). Use: Breathing. 2) Resource: Soil, plants, seeds, animals. Use: Growing plants, providing food. 3) Resource: Energy resources (e.g., wood, oil/crude oil, natural gas, solar energy/sun, wind/wind energy, coal). Use: Heating, providing electricity, light. 4) Resource: Manufacturing resources such as wood, rocks, minerals. Use: Making/building houses, roads, paper etc. ii) If responses mention gasoline, petrol, or diesel with a correct use give code 20.		
Correct Response			
20	Names one of the natural resources indicated in the note above and describes its use <p>Examples:</p> Air. We breathe it in. Plants are used in everyday life to give oxygen. Seeds. If you plant a seed of an orange it will produce a tree and give us oranges. Grass is eaten by cows who produce milk. Animals are used in every day life because we eat them. Wood. It is used for heating and cooking. Wind. It is used for drying clothes. Rocks. They are crushed and used to make roads. Minerals. They are used for making jewellery. Salt. It is used in cooking. Gasoline keeps a car running.		
Partially Correct Response			
10	Names one of the natural resources indicated in the note above but the description of its use is either nonspecific, incorrect, or absent <p>Examples:</p> The wind blows in the daytime. The trees are a natural resource because seeds blow off trees and start to grow. Soil is made from decaying matter. Land for walking on. Air. We need it to live.		
Incorrect Response			
70	Names water with or without a correct use <p>Examples:</p> A river is used for drinking, bathing, and washing clothes.		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <p>Examples:</p> Milk for drinking. One other resource that is used in everyday life is electricity.		

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
United States	47	New Zealand	28
Kazakhstan	41	Australia	26
Czech Republic	40	<i>International Mean</i>	26
Hong Kong	40	Scotland	22
England	30	Singapore	22

Question 14	Item Label: Common characteristics of deserts	Content Domain: Earth Science	Cognitive Domain: Applying
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Code	Response	Item: S04_14
Correct Response		
10	C	
Incorrect Response		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)	

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Kazakhstan	64	<i>International Average</i>	37
Netherlands	64	Singapore	36
Austria	63	England	32
United States	47	New Zealand	27
Australia	44	Scotland	26

Question 15	Item Label: Animal that sheds its outer covering	Content Domain: Life Science	Cognitive Domain: Knowing
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Code	Response	Item: S05_01
Correct Response		
10	B	
Incorrect Response		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)	

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
United States	89	England	77
Germany	87	Singapore	77
Japan	86	Scotland	68
Australia	86	<i>International Average</i>	64
Denmark	85	New Zealand	64
Chinese Taipei	85		

Question 16A/B	Item Label	Content Domain	Cognitive Domain
	Functions of human skeleton	Life Science	Knowing
Code	Response	Item: S05_02A	
Note:	Each of the two responses is coded separately. Each correct diagnostic code (10, 11, 12) may be used only once. If the two responses are essentially the same, the second response should be coded as 79. For example, if a response mentions “it protects the brain” and “it protects the heart”, the first response should be given a Code 10, and the second response should be given a Code 79. If only one response is given, the second should be coded as 99.		
Correct Response			
10	Refers to the skeleton (bones) protecting or enclosing the organs of the body (e.g., heart, lungs, brain, spinal cord)		
	Examples: It protects all your organs. The skull protects the brain. To protect the insides of the body.		
11	Refers to the skeleton (bones) supporting the body (or similar)		
	Examples: It makes it so you can stand up. So we don't fall down.		
12	Refers to the skeleton (bones) supporting the body (or similar)		
	Examples: If you don't have a skeleton you cannot move. To walk. In order to lift things.		
19	Other correct		
	Examples: Bones store calcium. It's where the blood cells are made. Muscles are attached to the bones.		
Incorrect Response			
70	Mentions only a property or part of the skeleton (bones) (No explicit function is given)		
	Examples: Bones are hard. The skull. The skeleton is straight.		
71	Gives only a vague response to shape, appearance or similar. (No explicit function is given)		
	Examples: So you are not like a rag doll. So they are not all flimsy. We would be mush without it.		

	To give shape to the body.
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)

16A

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Kazakhstan	85	United States	64
Hong Kong	84	Scotland	63
Netherlands	82	<i>International Average</i>	61
Singapore	71	New Zealand	59
England	65	Australia	56

16B

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong	66	Scotland	50
Singapore	64	United States	46
England	59	Australia	43
Kazakhstan	55	New Zealand	43
Slovenia	54	<i>International Average</i>	38

Question 17	Item Label: Bird likely to eat small mammals	Content Domain: Life Science	Cognitive Domain: Knowing
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Code	Response	Item: S05_03
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Correct Response

10	A
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Incorrect Response

79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)
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Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Denmark	92	Australia	81
Hungary	91	Singapore	80
Czech Republic	90	New Zealand	77
Scotland	84	England	77
United States	83	<i>International Average</i>	70

Question 18A	Item Label:	Content Domain:	Cognitive Domain:
	Feature of fish and mammals/fish	Life Science	Applying
Note:	If a response includes both correct and incorrect features, it should be scored as correct. Since only one feature is asked for, the incorrect portion is not considered unless it negates the correct portion.		
Code	Response	Item: S05_04	
Correct Response			
10	Names a physical feature or behaviour of fish that could be used to differentiate fish from marine (water) mammals Examples: Gills ('breathes' in oxygen from water) Scales Lays eggs Two-chambered heart Swim (gas) bladder		
11	Refers to "cold-blooded" nature of fish		
19	Other correct		
Incorrect Response			
70	Names a physical feature or behaviour of fish that CANNOT be used to differentiate fish from mammals Examples: Fins They can swim Tail		
71	Names an example of a "fish" rather than characteristic (May include some organisms that are not truly fish, such as jellyfish.) Examples: Catfish Shark		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	66	Australia	51
Hungary	66	Scotland	46
Italy	60	England	45
United States	59	New Zealand	43
Denmark	53	<i>International Average</i>	36

Question 18B	Item Label: Feature of fish and mammals/mammals	Content Domain: Life Science	Cognitive Domain: Applying
Note:	To receive credit for Part B, a separate physical feature or behaviour of mammals must be named even if it is related to the same function as what was named in Part A. A response that states that mammals do NOT have what has been named as a feature of fish is scored as incorrect. For example, if Part A states that “fish have gills” and Part B states only that “mammals do not have gills”, then Part B should receive Code 79. If Part B states that “mammals need to breath air” or that “mammals have lungs” it should be scored as correct (Code 10). If Part A states “cold-blooded”, and Part B states “not-cold blooded”, then Part B is given Code 79. If Part B states “warm-blooded”, it is given Code 11. If a response includes both correct and incorrect features, it should be scored as correct. Since only one feature is asked for, the incorrect portion is not considered unless it negates the correct portion.		

Code	Response	Item: S05_04
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Correct Response

10	Names a physical feature or behaviour of mammals that could be used to differentiate marine (water) mammals from fish Examples: Lungs (come to the surface to breath air) “Blowhole” Hair or fur Milk glands (produces milk for their young) Flippers (adapted front limbs) Gives live birth
11	Refers to “warm-blooded” nature of mammals
19	Other correct

Incorrect Response

70	Names a feature/behaviour of mammals that CANNOT be used to differentiate mammals from fish Examples: Teeth, ribs, nostrils
71	Names an example of a marine (water) mammal rather than a characteristic Examples: Whale, dolphin, seal
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	67	Australia	42
Italy	62	New Zealand	35
Hungary	60	Scotland	34
Denmark	53	<i>International Average</i>	31
United States	50	England	28

Question 19	Item Label:	Content Domain:	Cognitive Domain:
	Sugar dissolved in water	Physical Science	Knowing
Code	Response	Item: S05_05	
Correct Response			
10	C		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Chinese Taipei	83	Australia	62
Japan	76	New Zealand	58
Lithuania	76	<i>International Average</i>	55
Singapore	67	United States	52
England	64	Scotland	51

Question 20A	Item Label:	Content Domain:	Cognitive Domain:
	Turn a liquid into a gas	Physical Science	Applying
Code	Response	Item: S05_06	
Note:	Credit may be given for responses that refer to solid, liquid, and gas as 'ice', 'water', and 'water vapor'.		
Correct Response			
10	Refers explicitly to boiling or evaporation		
11	Refers to adding heat (energy) or raising the temperature (explicitly or implicitly)		
	Examples: Put it in a pot and turn on the stove. Heat it. Put it out in the sun. Make it hot.		
19	Other correct		
Incorrect Response			
70	Refers to the process of freezing (explicitly or implicitly)		
71	Refers to the process of melting (explicitly or implicitly)		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	87	United States	53
Hong Kong	74	<i>International Average</i>	40
Japan	71	Australia	38
Kazakhstan	68	Scotland	34
England	65	New Zealand	26

Question 20B	Item Label:	Content Domain:	Cognitive Domain:
	Turn a liquid into a solid	Physical Science	Applying
Code	Response	Item: S05_06	
Correct Response			
10	Refers explicitly to freezing		
11	Refers to cooling, removing heat (energy) or decreasing the temperature (explicitly or implicitly)		
	Examples: Put it in the freezer. Cool it down. Make it cold.		
19	Other correct		
Incorrect Response			
70	Refers to the process of boiling (explicitly or implicitly)		
71	Refers to the process of melting (explicitly or implicitly)		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	88	United States	65
England	82	Australia	55
Hong Kong	80	Scotland	50
Kazakhstan	77	<i>International Average</i>	47
Slovenia	71	New Zealand	45

Question 21	Item Label: People should not drink sea water	Content Domain: Earth Science	Cognitive Domain: Knowing
Code	Response	Item: S05_07	
Correct Response			
10	Refers only to the ocean water being salty Examples: Ocean water contains a lot of salt. Salt water makes you sick. There is salt and sand. There is too much salt in it.		
11	Refers only to oceans being polluted, dirty, containing germs, etc. Examples: Ocean water has a lot of bacteria in it. It might have germs in it that make you sick. It needs to be purified first. Ocean water could be polluted. They could get poisoned.		
12	Response includes a combination of both codes 10 and 11 Examples: It is salty and smelly and has dirt in it. It might be dirty, polluted and salty.		
19	Other correct		
Incorrect Response			
70	Mentions only that ocean water makes you sick (or similar) (No reference to salt, pollution, etc.) Examples: It makes you sick. It's not healthy to drink ocean water.		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) Examples: It smells.		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	93	Scotland	82
Latvia	90	United States	81
Germany	88	Australia	77
Japan	87	New Zealand	76
England	85	<i>International Average</i>	<i>72</i>

Question 22	Item Label:	Content Domain:	Cognitive Domain:
	One way Sun and Moon differ	Earth Science	Knowing
Code	Response	Item: S05_08	
Note:	If more than one response is given, the code corresponding to the first correct response should be assigned. Since only one response is asked for, the incorrect portion of the response should not be considered unless it negates the correct portion of the response.		
Correct Response			
10	Refers to the Sun giving off light or heat and/or the Moon not		
	Examples: The Sun brings light and the Moon does not. Sun is hot, Moon is not. The Sun is a big fire ball. The Sun shines light. The Moon glows. The Moon is cold. The Sun is not. The Sun makes its own light but the Moon reflects it.		
11	Refers to differences in visibility (or appearance)		
	Examples: Sun is bright, so it's easier to see during the day. Sun is yellow, not blue like Moon. Sun is always the same shape but Moon is not. The Sun comes up every morning, but the Moon does not. They are different colours. The Sun doesn't come out at night. The Moon can block the sun, but the Sun cannot block the Moon.		
12	Refers to differences in size, composition or physical/structural features		
	Examples: Sun is a star. Moon has craters. Sun has lots of gases and Moon is just rock. The Sun is bigger.		
19	Other correct		
	Examples: The Moon is closer than the Sun.		
Incorrect Response			
70	Refers to the Moon only being visible at night		
	Examples: The Moon only comes out at night. You see the Sun in the day and the Moon at night. One comes out in the day and one comes out at night.		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
	Examples: There is no gravity on the Moon.		

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	86	Scotland	74
England	82	Russian Federation	74
Latvia	79	United States	70
Slovak Republic	76	Australia	69
New Zealand	75	<i>International Average</i>	<i>57</i>

Question 23	Item Label: Representing number from word	Content Domain: Number	Cognitive Domain: Knowing
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Code	Response	Item: M04_01
Correct Response		
10	B	
Incorrect Response		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)	

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Chinese Taipei	89	Scotland	73
Netherlands	88	<i>International Mean</i>	<i>71</i>
Singapore	86	New Zealand	70
England	84	Australia	67
United States	79		

Question 24	Item Label: Draw a circle around the biscuits	Content Domain: Number	Cognitive Domain: Knowing
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Code	Response	Item: M04_02
Correct Response		
10	Draws a circle around any 4 biscuits or draws separate circles around 4 biscuits or draws 3 circles, each circle enclosing 4 biscuits	
Incorrect Response		
70	Draws a circle around 3 biscuits	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	85	United States	40
Singapore	75	Australia	39
Kazakhstan	70	Scotland	38
England	47	New Zealand	38
<i>International Mean</i>	<i>40</i>		

Question 25		Item Label:	Content Domain:	Cognitive Domain:
		Fraction equal to 2/3	Number	Knowing
Code	Response	Item: M04_03		
Correct Response				
10	C			
Incorrect Response				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)	
Singapore	84	United States	45	
Hong Kong SAR	77	<i>International Mean</i>	25	
Netherlands	55	New Zealand	21	
Kazakhstan	53	Australia	21	
England	47	Scotland	13	

Question 26		Item Label:	Content Domain:	Cognitive Domain:
		Fraction of money Joe spent	Number	Knowing
Code	Response	Item: M04_04		
Correct Response				
10	$\frac{8}{10}$ or equivalent			
Incorrect Response				
70	$\frac{8}{20}$ or equivalent			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)	
Chinese Taipei	92	Australia	51	
Hong Kong SAR	88	New Zealand	42	
Singapore	82	Scotland	38	
United States	69	<i>International Mean</i>	37	
England	53			

Question 27	Item Label:	Content Domain:	Cognitive Domain:
	Number sentence for pencils in a box	Number	Applying
Code	Response	Item: M04_05	
Correct Response			
10	D		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Chinese Taipei	93	England	69
Russian Federation	87	Australia	60
United States	86	<i>International Mean</i>	59
Singapore	86	Scotland	56
Hong Kong SAR	84	New Zealand	54
Kazakhstan	82		

Question 28	Item Label:	Content Domain:	Cognitive Domain:
	Line of symmetry	Geometric Shapes and measures	Knowing
Code	Response	Item: M04_06	
Correct Response			
10	A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	97	Scotland	86
Singapore	97	Australia	79
Slovenia	92	New Zealand	72
England	92	<i>International Mean</i>	65
United States	90		

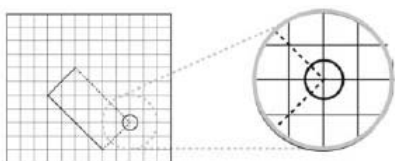
Question 29	Item Label: Draw other 2 sides of a rectangle	Content Domain: Geometric Shapes and Measures	Cognitive Domain: Applying
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Code	Response	Item: M04_07
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Correct Response

10 Correct rectangle drawn with the fourth vertex lying within the circle, as shown below

Note: The centre of the circle is the correct position for the vertex. The radius of the circle is half the length of a square on the grid.

**Incorrect Response**

79 Incorrect (including crossed out/erased, stray marks, illegible, or off task)

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	90	Australia	68
Japan	78	New Zealand	61
Chinese Taipei	77	United States	55
England	70	Scotland	55
Singapore	69	<i>International Mean</i>	54

Question 30	Item Label: Area of the fence to be painted	Content Domain: Geometric Shapes and Measures	Cognitive Domain: Applying
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Code	Response	Item: M04_08
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Correct Response

10 C

Incorrect Response

79 Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	92	England	44
Kazakhstan	87	<i>International Mean</i>	42
Singapore	84	Australia	28
Chinese Taipei	82	Scotland	17
Russian Federation	80	New Zealand	15
United States	48		

Question 31A	Item Label:	Content Domain:	Cognitive Domain:
	Similarity in the two given shapes	Geometric Shapes and Measures	Reasoning
Code	Response	Item: M04_09	
Correct Response			
10	Both are triangles/ both have 3 sides/ both have same number of sides/ both have 3 angles/ both have 3 corners or equivalent statements		
11	Both have straight sides		
Incorrect Response			
70	They are the same shape		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	83	Australia	68
Singapore	80	Scotland	61
Latvia	78	New Zealand	57
England	73	<i>International Mean</i>	49
United States	70		

Question 31B	Item Label:	Content Domain:	Cognitive Domain:
	Difference in the two given shapes	Geometric Shapes and Measures	Reasoning
Code	Response	Item: M04_09	
Correct Response			
10	One has a right angle, one does not		
11	One has 2 sides/ angles the same size/ is isosceles/ has a line of symmetry (the other does not)		
12	One is bigger/ longer/ wider/ has a larger area than the other or equivalent statement about size		
Incorrect Response			
70	They are different shapes/ they are not the same shape		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	82	<i>International Mean</i>	36
Chinese Taipei	67	New Zealand	36
Singapore	67	Scotland	34
England	52	Australia	31
United States	50		

Question 32	Item Label:	Content Domain:	Cognitive Domain:
	Estimate the height of the tree	Geometric Shapes and Measures	Knowing
Code	Response	Item: M04_10	
Correct Response			
10	C		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Kazakhstan	46	Scotland	33
Hong Kong SAR	45	United States	32
England	40	New Zealand	32
Singapore	38	<i>International Mean</i>	31
Australia	34		

Question 33	Item Label:	Content Domain:	Cognitive Domain:
	Complete the bar graph	Data Display	Applying
Code	Response	Item: M04_11	
Correct Response			
20	Both bars correctly drawn. Bar for fast is between 4 and 6 (inclusive). Bar for medium is taller than bar for fast but less than 7.5 (exclusive).		
Partial Response			
10	Only 1 bar correctly drawn		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	87	Australia	77
Japan	86	New Zealand	76
England	84	United States	75
Chinese Taipei	80	Scotland	74
Slovenia	78	<i>International Mean</i>	51

Question 34	Item Label: On which day John pick 5 apples	Content Domain: Data Display	Cognitive Domain: Knowing
Code	Response	Item: M04_12	
Correct Response			
10	D		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Netherlands	78	Australia	61
Singapore	73	New Zealand	58
Germany	73	Scotland	56
United States	71	<i>International Mean</i>	50
England	71		

Question 35	Item Label: How many more girls in class	Content Domain: Data Display	Cognitive Domain: Reasoning
Code	Response	Item: M04_13	
Correct Response			
10	A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	63	Australia	36
Hong Kong SAR	63	Scotland	34
Kazakhstan	51	<i>International Mean</i>	32
England	40	New Zealand	32
United States	38		

Question 36		Item Label:	Content Domain:	Cognitive Domain:
		9 rows of chairs by 15 chairs in row	Number	Applying
Code	Response		Item: M05_01	
Correct Response				
10	C			
Incorrect Response				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
Country	Percent Full Credit (weighted)		Country	Percent Full Credit (weighted)
Hong Kong SAR	92		United States	73
Singapore	91		<i>International Mean</i>	68
Chinese Taipei	89		Australia	65
Lithuania	87		New Zealand	62
England	74		Scotland	60

Question 37		Item Label:	Content Domain:	Cognitive Domain:
		A 204cm rope cut into 4	Number	Applying
Code	Response		Item: M05_02	
Correct Response				
10	51			
Incorrect Response				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
Country	Percent Full Credit (weighted)		Country	Percent Full Credit (weighted)
Hong Kong SAR	91		United States	50
Chinese Taipei	90		Australia	46
Singapore	89		New Zealand	44
England	57		Scotland	41
<i>International Mean</i>	55			

Question 38	Item Label:	Content Domain:	Cognitive Domain:
	Number in box of number sentence	Number	Applying
Code	Response	Item: M05_03	
Correct Response			
10	D		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Kazakhstan	75	<i>International Mean</i>	27
Singapore	72	England	24
Hong Kong SAR	69	Australia	19
Russian Federation	66	New Zealand	11
United States	27	Scotland	10

Question 39A	Item Label:	Content Domain:	Cognitive Domain:
	Renting bikes / fill table	Number	Applying
Code	Response	Item: M05_04	
Correct Response			
10	Table completed correctly to 6 hours:	3 hours 4 5 6	14zeds 17 20 23
		3 hours 4 5 6	14 zeds 16 18 20
Incorrect Response			
70	One or more entries for Mountain Club incorrect; Roadrace Club entries all correct		
71	One or more entries for Roadrace Club incorrect; Mountain Club entries all correct		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	85	Australia	59
Japan	85	Scotland	56
Singapore	82	<i>International Mean</i>	52
England	64	New Zealand	51
United States	63		

Question 39B	Item Label:	Content Domain:	Cognitive Domain:
	Renting bikes / same price	Data Display	Knowing
Code	Response	Item: M05_04	
Correct Response			
10	3 (as long as does not contradict Part A including table empty or incomplete)		
11	Number(s) correct according to a complete but erroneous table in Part A OR indicates no match according to a complete but erroneous table in Part A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Japan	87	United States	48
Germany	67	Australia	46
Hong Kong SAR	67	<i>International Mean</i>	39
Singapore	65	New Zealand	39
England	51	Scotland	34

Question 39C	Item Label:	Content Domain:	Cognitive Domain:
	Renting bikes / 12 hours	Data Display	Reasoning
Code	Response	Item: M05_4	
Correct Response			
10	B		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Hong Kong SAR	80	United States	65
Japan	80	Australia	62
Chinese Taipei	77	<i>International Mean</i>	57
Singapore	73	New Zealand	56
England	65	Scotland	48

Question 40	Item Label:	Content Domain:	Cognitive Domain:
	A man took his children to a fair	Number	Reasoning
Code	Response	Item: M05_05	
Correct Response			
20	10 or 10 zeds with work shown		
Partial Response			
10	10 or 10 zeds with no work shown		
11	Correct method but computation error		
Incorrect Response			
70	$\frac{50}{4}$ or 12.5		
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	52	New Zealand	18
Denmark	22	Chinese Taipei	18
United States	21	Australia	15
England	21	Scotland	13
Netherlands	19	<i>International Mean</i>	12

Question 41	Item Label:	Content Domain:	Cognitive Domain:
	Area of rectangular paper vs. L shape	Geometric Shapes and Measures	Knowing
Code	Response	Item: M05_06	
Correct Response			
10	B		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Chinese Taipei	78	England	49
Kazakhstan	66	<i>International Mean</i>	47
Japan	64	United States	46
Singapore	56	Scotland	42
Australia	54	New Zealand	40

Question 42	Item Label:	Content Domain:	Cognitive Domain:
	How many pencils Maria has	Number	Applying
Code	Response	Item: M05_07	
Correct Response			
10	D		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	90	Australia	61
Hong Kong SAR	89	New Zealand	59
Chinese Taipei	86	<i>International Mean</i>	58
England	72	Scotland	57
United States	65		

Question 43	Item Label:	Content Domain:	Cognitive Domain:
	Length of side AB in figure	Geometric Shapes and Measures	Knowing
Code	Response	Item: M05_08	
Correct Response			
10	A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	73	<i>International Mean</i>	47
Japan	70	England	44
Hong Kong SAR	64	New Zealand	44
Kazakhstan	64	United States	42
Australia	47	Scotland	38

Question 44	Item Label:	Content Domain:	Cognitive Domain:
	Chart showing number of houses	Data Display	Applying
Code	Response	Item: M05_09	
Correct Response			
10	A		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Chinese Taipei	89	Australia	68
Hong Kong SAR	89	Scotland	68
Singapore	87	New Zealand	61
United States	79	<i>International Mean</i>	<i>57</i>
England	79		