



Trends in International Mathematics and Science Study

**TIMSS** 2006/07

Year 5 - BOOKLET

**2**

# 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.

<b>Question 1</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Living and nonliving things	Life Science	Applying
<b>Code</b>	<b>Response</b>	<b>Item: S02_01</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Singapore	91	United States	73
Japan	89	Scotland	69
Kazakhstan	88	Australia	67
Hong Kong	87	<b>New Zealand</b>	<b>61</b>
England	73	<i>International Mean</i>	61
<b>Question 2</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Classification of six-legged animal	Life Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S02_02</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	83	Netherlands	53
Singapore	76	Scotland	50
Australia	64	United States	48
Japan	57	<b>New Zealand</b>	<b>45</b>
England	53	<i>International Mean</i>	40
Hungary	53		

<b>Question 3</b>	<b>Item Label:</b> Life cycle of a moth	<b>Content Domain:</b> Life Science	<b>Cognitive Domain:</b> Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S02_03</b>	
<b>Correct Response</b>			
20	Names three stages correctly:		
<b>Partially Correct Response</b>			
10	Names one or two stages correctly		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Slovak Republic	66	<b>New Zealand</b>	<b>52</b>
Singapore	64	United States	48
Chinese Taipei	61	England	36
Australia	56	Scotland	33
Hungary	56	<i>International Mean</i>	33

<b>Question 4</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Where plants get their energy from	Life Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S02_04</b>	
<b>Correct Response</b>			
10	D		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Singapore	91	Australia	39
United States	49	England	39
Lithuania	48	<i>International Mean</i>	33
Italy	45	<b>New Zealand</b>	<b>29</b>
Denmark	41	Scotland	29

<b>Question 5</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Smoking is harmful to which organ	Life Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S02_05</b>	
<b>Correct Response</b>			
10	A		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Netherlands	95	England	88
Czech Republic	93	Australia	87
Slovenia	93	<b>New Zealand</b>	<b>84</b>
Scotland	90	Singapore	82
United States	89	<i>International Mean</i>	78

<b>Question 6</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Weight of object X compared to Y-Z	Physical Science	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: S02_06</b>	
<b>Correct Response</b>			
10	A		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Russian Federation	93	Australia	86
Latvia	91	Scotland	85
Kazakhstan	90	United States	85
England	89	<b>New Zealand</b>	<b>81</b>
Singapore	89	<i>International Mean</i>	<i>74</i>

<b>Question 7</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Reason for bulb not lighting	Physical Science	Applying
<b>Code</b>	<b>Response</b>	<b>Item: S02_07</b>	
<b>Correct Response</b>			
10	Mentions that the battery may not be working  Examples: The battery has no energy left. There is not enough volts in the battery. The battery is flat. The battery may be dead. The battery might be weak. The battery is not working. It needs more batteries. It needs a second battery. Maybe the power is not strong enough.		
11	Mentions that the circuit is not complete  Examples: One of the wires may be loose. There is a cut in the wire. The battery may not be connected properly. The bulb may be loose. The bulb wasn't screwed in right.		
<b>Incorrect Response</b>			
70	Mentions that the battery is put in the wrong way round  Examples: I think that the + side of the battery was put on the – side of the battery causing the bulb not to get energy.		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)  Examples: The wires are not good. The bulb is bad. The battery is not in all the way. The battery is not put in properly.		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	79	United States	62
Singapore	72	Australia	60
Netherlands	68	Scotland	59
Hungary	64	<b>New Zealand</b>	<b>56</b>
England	63	<i>International Mean</i>	<i>47</i>

<b>Question 8</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Separation of a mixture	Physical Science	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: S02_08</b>	
<b>Correct Response</b>			
10	D		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Japan	93	United States	51
Kazakhstan	75	<i>International Mean</i>	51
Singapore	74	Australia	49
Chinese Taipei	72	Scotland	45
England	52	<b>New Zealand</b>	<b>43</b>

<b>Question 9</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Which one runs only on electricity	Physical Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S02_09</b>	
<b>Correct Response</b>			
10	C		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Russian Federation	88	<b>New Zealand</b>	<b>75</b>
Australia	85	England	74
Czech Republic	85	United States	74
Latvia	82	<i>International Mean</i>	65
Singapore	76	Scotland	62

Question 10	Item Label:	Content Domain:	Cognitive Domain:
	Water disappearing from a dish	Physical Science	Applying
Code	Response	Item: S02_10	
Correct Response			
10	Refers specifically to evaporation and/or water vapour forming		
	Examples: The water evaporates into water vapour. The sun made the water evaporate. Because the heat made it evaporate. The water evaporated. The water has become water vapour. The water became a gas.		
19	Other correct		
	Examples: The water absorbs into the sky.		
Incorrect Response			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
	Examples: The water dried up. The sun heated the water. The water heated up. The sun absorbs water. It has soaked up. The sun dried it up.		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Singapore	86	United States	60
Japan	78	<i>International Mean</i>	50
Kazakhstan	77	Australia	47
Russian Federation	74	Scotland	37
England	65	<b>New Zealand</b>	<b>33</b>

<b>Question 11</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Three ice cubes placed in water	Physical Science	Applying
<b>Code</b>	<b>Response</b>	<b>Item: S02_11</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	60	<b>New Zealand</b>	<b>44</b>
Japan	58	United States	44
Singapore	57	<i>International Mean</i>	39
Australia	56	England	37
Austria	56	Scotland	36

<b>Question 12</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		What covers most of Earth's surface	Earth Science	Knowing
<b>Code</b>	<b>Response</b>		<b>Item: S02_12</b>	
<b>Correct Response</b>				
10	C			
<b>Incorrect Response</b>				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>		<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Kazakhstan	87		Russian Federation	74
Lithuania	80		Scotland	71
United States	75		Australia	67
England	74		<b>New Zealand</b>	<b>62</b>
Singapore	74		<i>International Mean</i>	56

<b>Question 13A</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		Planet closest to the sun	Earth Science	Applying
<b>Code</b>	<b>Response</b>		<b>Item: S0 2_13A</b>	
<b>Correct Response</b>				
10	C			
<b>Incorrect Response</b>				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>		<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Australia	79		Hong Kong	75
England	79		United States	74
Russian Federation	77		Scotland	70
Slovak Republic	77		<b>New Zealand</b>	<b>69</b>
Singapore	76		<i>International Mean</i>	61

<b>Question 13B</b>	<b>Item Label:</b> Planet with lowest temperature	<b>Content Domain:</b> Earth Science	<b>Cognitive Domain:</b> Applying
<b>Code</b>	<b>Response</b>	<b>Item: S02_13B</b>	
<b>Correct Response</b>			
10	Identifies Saturn		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Singapore	68	United States	58
Australia	67	Netherlands	57
England	66	Germany	55
Scotland	59	Lithuania	55
<b>New Zealand</b>	<b>58</b>	<i>International Mean</i>	<i>41</i>

<b>Question 14</b>	<b>Item Label:</b> Which group of animals are mammals	<b>Content Domain:</b> Life Science	<b>Cognitive Domain:</b> Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S03_01</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Singapore	76	Australia	54
Slovak Republic	72	Scotland	50
Denmark	67	<i>International Mean</i>	<i>48</i>
Czech Republic	65	England	45
United States	59	<b>New Zealand</b>	<b>41</b>

<b>Question 15</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Can oak tree and sunflower reproduce	Life Science	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: S03_02</b>	
<b>Correct Response</b>			
10	<p>NO with a correct explanation based on two different species (types, kinds, etc.) not being able to reproduce (explicitly or implicitly)</p> <p>Examples:</p> <p>The oak tree and sunflower are different so they cannot reproduce together.</p> <p>They can't reproduce because they aren't the same kind of plant.</p> <p>Only the same kind of plants can reproduce.</p> <p>They are not the same type.</p> <p>Because they are different plants.</p> <p>The oak tree doesn't have the right kind of pollen.</p>		
<b>Incorrect Response</b>			
70	<p>NO with no explanation or an incorrect explanation (may include a true statement that does not answer the question).</p> <p>Examples:</p> <p>The tree is too big.</p> <p>There are no flowers on the tree.</p> <p>Because it would not be natural.</p> <p>Because they do not match.</p> <p>The oak tree has acorns.</p> <p>Sunflowers do not grow on trees.</p> <p>The oak tree already has flowers.</p> <p>You cannot mix them.</p>		
71	<p>YES with no explanation or an incorrect explanation</p> <p>Examples:</p> <p>Because they both have seeds.</p> <p>Plants can crossbreed.</p>		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	45	England	20
Singapore	39	United States	19
Japan	28	<b>New Zealand</b>	<b>17</b>
Hong Kong	27	<i>International Mean</i>	<i>17</i>
Australia	20	Scotland	16

<b>Question 16</b>	<b>Item Label:</b> Skulls of plant-eater	<b>Content Domain:</b> Life Science	<b>Cognitive Domain:</b> Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: S03_03</b>	
<b>Correct Response</b>			
20	<p>Correct skull identification AND correct explanation.            Animal that ate plants = SKULL 2            Animal that ate other animals = SKULL 1            Explanation refers to at least one tooth structure in either Skull 1 or 2 that enables it to eat meat or plants.</p> <p>Examples:            Sharp teeth are used for ripping meat and crushing bones.            Flat teeth are needed for chomping on leaves.            Skull 1 has the sharpest teeth for biting through muscles.            The teeth in Skull 2 don't need to be as big or sharp to bite off grass.            The flat teeth in Skull 2 are good for grinding.            Because the teeth on #1 are sharp and the teeth on #2 are dull.            The animal that ate meat has the sharp teeth.</p>		
29	Other fully correct		
<b>Partial Response</b>			
10	<p>Correct skull identification but with an explanation that does not give an adequate description of tooth structure</p> <p>Examples:            Skull 1 ate meat and Skull 2 ate plants.            Skull 1 is a meat eater.            Skull 1 has big teeth.</p>		
19	Other partially correct		
<b>Incorrect Response</b>			
70	Correct skull identification with NO explanation		
71	<p>Reverses skull identification with or without explanation            Animal that ate plants = SKULL 1            Animal that ate other animals = SKULL 2</p>		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	72	Germany	61
Singapore	69	Austria	58
Australia	68	Hong Kong	58
United States	66	Scotland	54
England	63	<i>International Mean</i>	41
<b>New Zealand</b>	<b>61</b>		

<b>Question 17</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		Energy to heal a cut	Life Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S03_04</b>		
<b>Correct Response</b>				
10	C			
<b>Incorrect Response</b>				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>	
Singapore	63	England	34	
Japan	63	<i>International Mean</i>	33	
Netherlands	53	Australia	32	
Italy	49	<b>New Zealand</b>	<b>31</b>	
United States	35	Scotland	21	

<b>Question 18A</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		Uses of water as ice	Physical Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S03_05</b>		
<b>Correct Response</b>				
10	Names a correct use of ice			
	Examples: Cooling/freezing, adding to drinks, preserving food, treating injuries/burns, etc.			
19	Other correct			
<b>Incorrect Response</b>				
70	Refers only to a property of ice with no specific use provided			
	Examples: Water is ice but a lot colder. You can melt it. Ice is cold, solid, it melts, etc. When you put water into the freezer it becomes ice.			
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>	
Hong Kong	83	Russian Federation	75	
Slovenia	82	Australia	74	
England	80	Scotland	70	
Singapore	78	<b>New Zealand</b>	<b>66</b>	
United States	77	<i>International Mean</i>	55	

<b>Question 18B</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Uses of water as liquid	Physical Science	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: S03_05</b>	
<b>Correct Response</b>			
10	Names a correct use of liquid water  Examples: Drinking, bathing, swimming, watering plants/crops, cooking, use as a solvent (tea, lemonade, etc.), use in cleaning/washing clothes, putting out fires, etc.		
19	Other correct		
<b>Incorrect Response</b>			
70	Refers only to a property of water with no specific use provided  Examples: Water is a liquid. When ice melts it forms water. You can pour it.		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)  Examples: To keep us alive.		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Latvia	86	England	75
Hong Kong	82	Australia	68
Slovenia	81	<b>New Zealand</b>	<b>63</b>
United States	77	Scotland	63
Singapore	76	<i>International Mean</i>	56

<b>Question 19</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Beans and heated metal ruler	Physical Science	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: S03_06</b>	
<b>Correct Response</b>			
10	A		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Japan	92	United States	66
Singapore	88	Australia	59
Hong Kong	75	<b>New Zealand</b>	<b>58</b>
Slovenia	70	Scotland	58
England	67	<i>International Mean</i>	<i>57</i>

<b>Question 20</b>	<b>Item Label:</b> Bubbles rise in water	<b>Content Domain:</b> Physical Science	<b>Cognitive Domain:</b> Applying
<b>Code</b>	<b>Response</b>	<b>Item: S03_07</b>	
<b>Correct Response</b>			
10	Refers to bubbles (gas, air, etc.) being “lighter” or less dense than water (or similar).  Examples: They are very light. Bubbles are less dense than the water. They rise because they are made from air which is lighter than water. They are not heavy so they go to the top. Bubbles can float in water.		
11	Refers to gas (air, oxygen, carbon dioxide) being inside bubbles. (No explicit reference to bubbles being lighter, less dense, etc.)  Examples: He is blowing oxygen. He blows air and air pushes the bubbles up to the top. Air bubbles want to get out. Water pushes the air up. Because air rises. Bubbles have air in them. The gas wants to get free.		
19	Other correct		
<b>Incorrect Response</b>			
70	Repeats information given in the stem. (No explicit reference to air (gas) or bubbles being lighter.)  Examples: He blows so hard. Bubbles always go up. Because you are breathing into the straw.		
71	Refers only to pressure (or similar) but with inadequate connection to the problem.  Examples: Bubbles rise because of pressure. Because they cannot get anymore pressure at the bottom.		
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)  Examples: There is nothing in the straw. There isn't anything to weigh them down.		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Russian Federation	79	England	66
Chinese Taipei	77	<b>New Zealand</b>	<b>64</b>
Denmark	74	United States	61

Singapore	72	Scotland	54
Australia	67	<i>International Mean</i>	52

<b>Question 21</b>	<b>Item Label:</b> Main reason we see the Moon	<b>Content Domain:</b> Earth Science	<b>Cognitive Domain:</b> Applying
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<b>Code</b>	<b>Response</b>	<b>Item: S03_08</b>
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**Correct Response**

10	B
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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)
Singapore	81	Australia	52
Chinese Taipei	81	United States	52
Hong Kong	73	Scotland	48
Slovak Republic	71	<i>International Mean</i>	46
England	67	<b>New Zealand</b>	<b>45</b>

<b>Question 22A</b>	<b>Item Label:</b> Two seasons/name	<b>Content Domain:</b> Earth Science	<b>Cognitive Domain:</b> Knowing
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<b>Code</b>	<b>Response</b>	<b>Item: S03_09</b>
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**Correct Response**

	Identifies two correct seasons. (Adapted for country-specific seasons.)
10	Examples: Summer and winter. Spring and autumn. Autumn and summer.

**Incorrect Response**

70	Identifies only one correct season
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79	Other 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)
Latvia	96	Australia	89
Chinese Taipei	93	<b>New Zealand</b>	<b>89</b>
Hong Kong	93	Scotland	85
England	91	<i>International Mean</i>	75
United States	90	Singapore	73

<b>Question 22B</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Two seasons/difference	Earth Science	Applying
<b>Code</b>	<b>Response</b>	<b>Item: S03_09</b>	
<b>Correct Response</b>			
10	Describes temperature differences  Examples: In winter it is cold, in summer it is warm. Summer is more pleasant because of the heat. It's hot and dry in summer.		
11	Describes precipitation differences  Examples: In the dry season there is very little rain; there is a lot in the rainy season. In winter it snows, in summer it rains. It is humid in the summer.		
19	Other correct  Examples: It is more sunny in the summer. There are more storms in winter.		
<b>Incorrect Response</b>			
70	Difference provided does not explicitly mention a difference in weather condition  Examples: Weather is good in summer and bad in winter. You have to wear more clothes in winter. The leaves fall in autumn, and the flowers blossom in the spring.		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Latvia	85	United States	69
Chinese Taipei	81	Australia	68
Japan	81	Scotland	68
England	76	Singapore	66
<b>New Zealand</b>	<b>70</b>	<i>International Mean</i>	<i>59</i>

<b>Question 23</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Arranging numbers in order	Number	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: M02_01</b>	
<b>Correct Response</b>			
10	D		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	95	Australia	81
Singapore	94	Scotland	78
Chinese Taipei	93	<b>New Zealand</b>	<b>72</b>
United States	85	<i>International Mean</i>	70
England	82		

<b>Question 24</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Number of tables needed	Number	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M02_02</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	82	England	63
Hong Kong SAR	80	Scotland	60
Netherlands	80	<i>International Mean</i>	57
Russian Federation	78	Australia	54
Singapore	76	<b>New Zealand</b>	<b>50</b>
United States	65		


<b>Question 25</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Multiply 53 and 26	Number	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: M02_03</b>	
<b>Correct Response</b>			
10	1378		
<b>Incorrect Response</b>			
70	118		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Chinese Taipei	88	<i>International Mean</i>	41
Singapore	80	England	28
Kazakhstan	78	Australia	9
Hong Kong SAR	76	<b>New Zealand</b>	<b>6</b>
Austria	75	Scotland	4
United States	50		

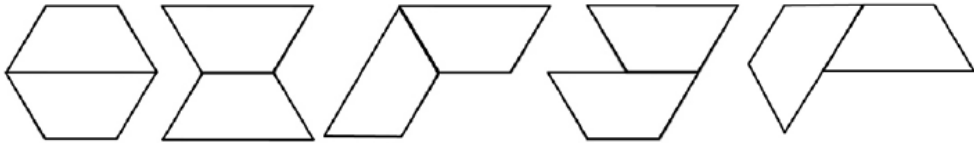
<b>Question 26</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Fraction of the rectangle shaded	Number	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: M02_04</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	82	England	55
Singapore	76	Scotland	49
Kazakhstan	66	United States	49
Netherlands	63	<b>New Zealand</b>	<b>47</b>
Russian Federation	62	<i>International Mean</i>	41
Australia	56		

<b>Question 27</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		Subtract 5.3 – 3.8	Number	Knowing
<b>Code</b>	<b>Response</b>	<b>Item: M02_05</b>		
<b>Correct Response</b>				
10	1.5			
<b>Incorrect Response</b>				
70	2.5			
71	15			
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>	
Chinese Taipei	95	<i>International Mean</i>	44	
Singapore	94	Australia	38	
Japan	90	Scotland	35	
United States	68	<b>New Zealand</b>	<b>23</b>	
England	52			

<b>Question 28</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		How much money is Rob left with	Number	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M02_06</b>		
<b>Correct Response</b>				
10	A			
<b>Incorrect Response</b>				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>	
Singapore	79	<i>International Mean</i>	38	
Chinese Taipei	68	Scotland	38	
Kazakhstan	67	Australia	35	
United States	48	<b>New Zealand</b>	<b>30</b>	
England	45			

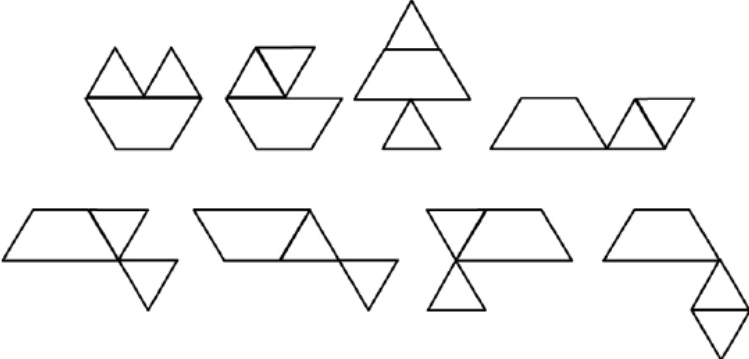
<b>Question 29</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		Perimeter of the rectangle	Geometry and Measures	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M02_07</b>		
<b>Correct Response</b>				
10	C			
<b>Incorrect Response</b>				
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>	
Singapore	92	England	62	
Hong Kong SAR	78	Denmark	62	
United States	68	<i>International Mean</i>	51	
Japan	65	Scotland	33	
Australia	63	<b>New Zealand</b>	<b>30</b>	
Russian Federation	63			

<b>Question 30A</b>		<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
		Make a 4-sided figure	Geometric Shapes and Measures	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M02_08</b>		
<b>Correct Response</b>				
10	Correct 4-sided figure turned in any position			
				
<b>Incorrect Response</b>				
70	Makes a larger triangle			
71	Makes a 4-sided figure, but not using the specific tiles, e.g., a larger parallelogram.			
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)			
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>	
Hong Kong SAR	78	England	59	
Singapore	69	United States	51	
Japan	65	Scotland	51	
Australia	64	<b>New Zealand</b>	<b>47</b>	
Russian Federation	63	<i>International Mean</i>	40	
Denmark	62			

<b>Question 30B</b>	<b>Item Label:</b> Make a 6-sided figure	<b>Content Domain:</b> Geometric Shapes and Measures	<b>Cognitive Domain:</b> Applying
<b>Code</b>	<b>Response</b>	<b>Item: M02_08</b>	
<b>Correct Response</b>			
10	Makes a correct 6-sided figure, e.g., one of those shown below (in any orientation)		
			
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	86	Australia	61
Japan	67	United States	54
Kazakhstan	67	Scotland	52
Denmark	66	<b>New Zealand</b>	<b>44</b>
England	64	<i>International Mean</i>	41
Singapore	64		

<b>Question 30C</b>	<b>Item Label:</b> Another 6-sided figure	<b>Content Domain:</b> Geometric Shapes and Measures	<b>Cognitive Domain:</b> Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: M02_08</b>	
<b>Correct Response</b>			
10	Any of four figures (6-sided) that was not used in part B		
<b>Incorrect Response</b>			
70	Repeats a correct figure already given in part B		
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	59	Australia	52
Japan	59	United States	45
Denmark	57	Scotland	40
Singapore	55	<b>New Zealand</b>	<b>39</b>
England	53	<i>International Mean</i>	31

<b>Question 30D</b>	<b>Item Label:</b> Make a 7-sided figure	<b>Content Domain:</b> Geometric Shapes and Measures	<b>Cognitive Domain:</b> Reasoning
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<b>Code</b>	<b>Response</b>	<b>Item: M02_08</b>
<b>Correct Response</b>		
10	Makes a correct 7-sided figure, e.g., one of those shown below (in any orientation)	
		

<b>Incorrect Response</b>		
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	60	Australia	36
Japan	52	United States	31
Kazakhstan	51	Scotland	27
Russian Federation	50	<b>New Zealand</b>	<b>26</b>
Singapore	44	<i>International Mean</i>	26
England	44		

<b>Question 31</b>	<b>Item Label:</b> Shape after 90 degree rotation	<b>Content Domain:</b> Geometric Shapes and Measures	<b>Cognitive Domain:</b> Knowing
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<b>Code</b>	<b>Response</b>	<b>Item: M02_09</b>	
<b>Correct Response</b>			
10	C		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
Country	Percent Full Credit (weighted)	Country	Percent Full Credit (weighted)
Kazakhstan	51	<b>New Zealand</b>	<b>30</b>
Japan	49	<i>International Mean</i>	30
England	49	United States	29
Singapore	46	Scotland	28
Australia	37		

<b>Question 32</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Put the correct number on the scale	Data Display	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M02_10</b>	
<b>Correct Response</b>			
10	All correct numbers shown: 50 40 30 20 10		
<b>Incorrect Response</b>			
70	Only 20, 30, 50 correctly entered on the scale		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Singapore	84	Japan	71
England	78	Australia	66
Hong Kong SAR	77	Scotland	65
United States	72	<b>New Zealand</b>	<b>59</b>
Chinese Taipei	72	<i>International Mean</i>	45

<b>Question 33</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Draw a bar to show Alonso's point	Data Display	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: M02_11</b>	
<b>Correct Response</b>			
10	Bar at 86		
11	Bar between 85-87 exclusive but not at 86		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	77	England	52
Chinese Taipei	72	United States	51
Japan	71	Scotland	44
Singapore	70	<b>New Zealand</b>	<b>42</b>
Australia	52	<i>International Mean</i>	38

<b>Question 34</b>	<b>Item Label:</b> Children share sweets equally	<b>Content Domain:</b> Number	<b>Cognitive Domain:</b> Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: M03_01</b>	
<b>Correct Response</b>			
10	6 or any number other than 6 that added to 74 gives a multiple of 8 (e.g., 14, 22)		
<b>Incorrect Response</b>			
70	9.25, 9¼, or 9 with 2 remainder		
71	2 (remainder) or 9		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Kazakhstan	65	Scotland	37
Russian Federation	65	<i>International Mean</i>	35
England	46	Australia	30
Singapore	43	United States	29
<b>New Zealand</b>	<b>41</b>		

<b>Question 35</b>	<b>Item Label:</b> Zak and Alan went running	<b>Content Domain:</b> Number	<b>Cognitive Domain:</b> Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: M03_02</b>	
<b>Correct Response</b>			
10	9		
<b>Incorrect Response</b>			
70	7		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Singapore	54	<b>New Zealand</b>	<b>33</b>
Hong Kong SAR	53	United States	33
Netherlands	42	Scotland	28
England	41	<i>International Mean</i>	27
Australia	40		

<b>Question 36</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Ken measured length of a blackboard	Number	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_03</b>	
<b>Correct Response</b>			
10	A		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	77	United States	50
Japan	68	Australia	47
Kazakhstan	65	Scotland	46
Singapore	60	<i>International Mean</i>	45
England	57	<b>New Zealand</b>	<b>45</b>

<b>Question 37</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	The rule Ann uses to get her number	Number	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: M03_04</b>	
<b>Correct Response</b>			
10	"Multiply by 3" or other fully correct		
<b>Incorrect Response</b>			
70	Multiply without specifying by what		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	54	Australia	29
Japan	49	England	29
Chinese Taipei	48	Scotland	26
Singapore	45	<i>International Mean</i>	26
United States	40	<b>New Zealand</b>	<b>23</b>

<b>Question 38</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	The rule for 2, 5, 11, 13	Number	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_05</b>	
<b>Correct Response</b>			
10	C		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Kazakhstan	69	United States	48
Russian Federation	61	Australia	45
Hong Kong SAR	59	<i>International Mean</i>	40
Singapore	57	<b>New Zealand</b>	<b>38</b>
England	49	Scotland	33

<b>Question 39</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	64 divided by box equals box	Number	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_06</b>	
<b>Correct Response</b>			
10	B		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Kazakhstan	88	<i>International Mean</i>	54
Hong Kong SAR	82	England	50
Japan	82	Scotland	47
Singapore	81	Australia	44
United States	69	<b>New Zealand</b>	<b>41</b>

<b>Question 40</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Triangular tiles to cover the figure	Geometric Shapes and Measures	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_07</b>	
<b>Correct Response</b>			
10	5		
<b>Incorrect Response</b>			
70	6		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	77	Australia	52
Singapore	69	United States	50
Chinese Taipei	68	Scotland	41
Japan	68	<i>International Mean</i>	40
England	54	<b>New Zealand</b>	<b>39</b>

<b>Question 41A</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Marytown park	Geometric Shapes and Measures	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_08</b>	
<b>Correct Response</b>			
10	Park 2.0cm from lake, measured from X to X (+/- 2mm)		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Japan	69	<b>New Zealand</b>	<b>35</b>
Chinese Taipei	65	<i>International Mean</i>	32
Singapore	46	Scotland	27
England	41	United States	24
Australia	40		

<b>Question 41B</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Marytown library	Geometric Shapes and Measures	Reasoning
<b>Code</b>	<b>Response</b>	<b>Item: M03_08</b>	
<b>Correct Response</b>			
10	Library between 2.8cm and 4.2cm from town hall, measured from X to X		
<b>Incorrect Response</b>			
70	Library less than 2.8cm from town hall, measured from X to X		
71	Library more than 4.2cm from town hall, measured from X to X		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	74	Singapore	53
Chinese Taipei	74	<b>New Zealand</b>	<b>49</b>
Japan	70	United States	45
Australia	59	<i>International Mean</i>	42
England	58	Scotland	41

<b>Question 41C</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Marytown school	Geometric Shapes and Measures	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_08</b>	
<b>Correct Response</b>			
10	School equidistant from park and library, X to X, measures to differ no more than 4mm		
<b>Incorrect Response</b>			
70	School is not equidistant (+/- 2 mm) from park and library		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Denmark	45	Singapore	36
Hong Kong SAR	44	<b>New Zealand</b>	<b>34</b>
Japan	43	<i>International Mean</i>	26
Australia	43	United States	26
England	37	Scotland	23

<b>Question 42</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Draw the reflection of the shape	Geometric Shapes and Measures	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_09</b>	
<b>Correct Response</b>			
10	Image correctly drawn		
<b>Incorrect Response</b>			
70	One or more of image lines drawn correctly, but image not completely correct		
71	Attempt to sketch an image under a transformation other than reflection (e.g., translation of image)		
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	95	Australia	62
Singapore	86	<b>New Zealand</b>	<b>62</b>
Denmark	78	<i>International Mean</i>	51
Latvia	77	United States	50
England	63	Scotland	46

<b>Question 43</b>	<b>Item Label:</b>	<b>Content Domain:</b>	<b>Cognitive Domain:</b>
	Complete table by gender with hats	Data Display	Applying
<b>Code</b>	<b>Response</b>	<b>Item: M03_10</b>	
<b>Correct Response</b>			
10	Boys: 1 hat, 1 no hat } or equivalent tallies Girls: 1 hat, 2 no hat }		
11	Names of boys and girls correctly placed in table		
<b>Incorrect Response</b>			
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)		
<b>Country</b>	<b>Percent Full Credit (weighted)</b>	<b>Country</b>	<b>Percent Full Credit (weighted)</b>
Hong Kong SAR	84	England	65
Japan	82	<b>New Zealand</b>	<b>63</b>
Singapore	80	Scotland	53
Australia	70	<i>International Mean</i>	48
United States	69		