RELEASED MATHEMATICS ITEMS

This book contains the released Trends in International Mathematics and Science Study (TIMSS) 2003 grade 4 mathematics assessment items. This is not a complete set of all TIMSS 2003 assessment items because some items are kept confidential so that they may be used in subsequent cycles of TIMSS to measure trends.

How Can This Set of Released Items Be Used?

In teacher-designed assessments. The items in this book present different ways of measuring students' understanding in various content and cognitive domains. A teacher may use these items to create an assessment according to the needs of the class after reviewing the items and selecting items of interest.

For feedback on student understanding. Student responses can be scored according to the scoring information provided in the book. Items that coincide with concepts taught in class allow the teacher to gain feedback on the students' understanding of assessed concepts. For example, a teacher might decide to examine the incorrect or partially correct responses of the class. The teacher might use the items to identify particular difficulties or misconceptions experienced by individual students, which can serve as the basis for some remedial teaching or focused practice.

To benchmark student performance. The teacher might also compare the percent of students in the class who responded correctly to an item with the percent of students who responded correctly to the same item in other education systems or in the United States.

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Guide to the Content and Layout of This Book

This book contains the released items from TIMSS 2003. Due to slight revisions in terminology and released information between cycles, the format for the items in each cycle differs slightly. Each item appears on a single page and is accompanied by a number of descriptors.

2003 Content Domains:

- Patterns and Relationships
- Data
- Geometry
- Measurement
- Number

2003 Cognitive Domains:

- Knowing facts and procedures
- Using concepts
- Solving routine problems
- Reasoning

Looking at *Symbolic linear equation of magazines*, the first item from TIMSS 2003, the content domain (*patterns and relationships*) and the cognitive domain (*solving routine problems*) are also accompanied by the main topic (*equations and formulas*).

International item numbers identify each item. This number appears just below the item box.

Correct answers are shown beneath each item. These correct answers take two forms:

- **Letter code**. This form is used for the correct response on multiple-choice items.

- **Scoring guide**. This form is used to assist in scoring write-in responses. In some cases, partial credit may be awarded and these items will provide guidelines for fully correct, partially correct, and incorrect responses.

Sample student responses are provided for some extended response items.

International benchmarks are provided in a table next to each item. These consist of statistics on the percentage of students in each country who answered the question correctly. The countries are ordered in terms of this percentage. The international average is included as well, and this display also indicates which countries scored significantly higher, significantly lower, and not significantly different from this international average.

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Equations and Formulas	Solving Routine Problems

Symbolic linear equation of magazines

$\square$ represents the number of magazines that Lina reads each week.

Which of these represents the total number of magazines that Lina reads in 6 weeks?

Ⓐ $\quad 6 + \square$

Ⓑ $\quad 6 \times \square$

Ⓒ $\quad \square + 6$

Ⓓ $\quad (\square + \square) \times 6$

Overall Percent Correct

Singapore	86	▲
Chinese Taipei	81	▲
Hong Kong, SAR	76	▲
Netherlands	72	▲
United States	72	▲
Japan	67	▲
Belgium (Flemish)	67	▲
Latvia	66	▲
Russian Federation	66	▲
England	66	▲
Cyprus	65	▲
Moldova, Republic of	64	▲
Lithuania	62	O
Hungary	61	O
Slovenia	60	O
Scotland	60	O
International average	**58**	
Australia	56	O
New Zealand	54	▼
Italy	50	▼
Armenia	46	▼
Philippines	38	▼
Norway	37	▼
Iran, Islamic Republic of	34	▼
Morocco	29	▼
Tunisia	20	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M012048

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Equations and Formulas	Using Concepts

Rob sold some of his apples

Rob had 50 apples. He sold some and then had 20 left.
Which of these is a number sentence that shows this?

Ⓐ $\square - 20 = 50$

Ⓑ $20 - \square = 50$

Ⓒ $\square - 50 = 20$

Ⓓ $50 - \square = 20$

Item Number: M031220

Overall Percent Correct

Chinese Taipei	89	▲
Japan	89	▲
Singapore	89	▲
Hong Kong, SAR	87	▲
Hungary	87	▲
Lithuania	87	▲
Russian Federation	87	▲
United States	84	▲
Cyprus	83	▲
Latvia	83	▲
Moldova, Republic of	81	▲
Belgium (Flemish)	81	▲
Slovenia	78	▲
England	78	▲
Netherlands	76	O
Australia	74	O
New Zealand	74	O
International average	**73**	
Scotland	72	O
Armenia	70	O
Italy	67	▼
Norway	59	▼
Iran, Islamic Republic of	54	▼
Philippines	52	▼
Morocco	33	▼
Tunisia	21	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Equations and Formulas	Using Concepts

The value of 37 times box plus 6

$37 \times \blacksquare = 703$.

What is the value of $37 \times \blacksquare + 6$?

Answer: _____

Item Number: M031249

Overall Percent Correct

Hong Kong, SAR	48	▲
Russian Federation	35	▲
Belgium (Flemish)	29	▲
Netherlands	27	▲
Japan	26	▲
Chinese Taipei	24	▲
Lithuania	23	▲
Singapore	23	▲
Armenia	22	▲
Italy	21	O
Latvia	21	▲
Hungary	19	O
Cyprus	17	O
Moldova, Republic of	17	O
International average	**17**	
Australia	10	O
Scotland	10	▼
Slovenia	9	▼
England	9	▼
New Zealand	8	▼
Norway	8	▼
United States	7	▼
Tunisia	5	▼
Philippines	4	▼
Iran, Islamic Republic of	2	▼
Morocco	2	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• 709 or 703 + 6

Incorrect Response

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

The value of 37 times box plus 6 (continued)

Item Number: M031249

Student Responses

Correct Response:

$37 \times \blacksquare = 703.$
What is the value of $37 \times \blacksquare + 6$?

Answer: __709__

Incorrect Response:

$37 \times \blacksquare = 703.$
What is the value of $37 \times \blacksquare + 6$?

Answer: __7117__

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Patterns	Reasoning

Complete number pattern

Here is a number pattern.

100, 1, 99, 2, 98, ☐, ☐, ☐

What three numbers should go in the boxes?

Ⓐ 3, 97, 4

Ⓑ 4, 97, 5

Ⓒ 97, 3, 96

Ⓓ 97, 4, 96

Item Number: M011027

Overall Percent Correct

Singapore	94	▲
United States	91	▲
Australia	88	▲
England	88	▲
Chinese Taipei	85	▲
Hong Kong, SAR	83	▲
Japan	83	▲
Belgium (Flemish)	83	▲
New Zealand	82	▲
Lithuania	80	▲
Scotland	79	▲
Cyprus	77	▲
Latvia	73	O
Moldova, Republic of	73	O
Russian Federation	73	▲
Hungary	70	O
Netherlands	70	O
Slovenia	69	O
International average	**69**	
Italy	58	▼
Philippines	56	▼
Armenia	47	▼
Norway	46	▼
Morocco	28	▼
Iran, Islamic Republic of	27	▼
Tunisia	15	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	A

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Patterns	Solving Routine Problems

The number to go in the center of the table

4	11	6
9		5
8	3	10

The rule for the table is that numbers in each row and column must add up to the same number. What number goes in the center of the table?

(A) 1

(B) 2

(C) 7

(D) 12

Overall Percent Correct

Hungary	77	▲
Chinese Taipei	75	▲
Japan	72	▲
Singapore	72	▲
Lithuania	70	▲
Hong Kong, SAR	69	▲
Cyprus	68	▲
Latvia	67	▲
Belgium (Flemish)	67	▲
Moldova, Republic of	66	▲
Russian Federation	66	O
England	65	O
Scotland	63	O
New Zealand	61	O
International average	**61**	
Netherlands	60	O
Australia	59	O
Slovenia	59	O
Italy	58	O
United States	58	▼
Armenia	51	▼
Iran, Islamic Republic of	49	▼
Norway	48	▼
Philippines	43	▼
Tunisia	42	▼
Morocco	41	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031023

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Patterns	Solving Routine Problems

The daily start times for a movie

The daily start times for showing a movie are listed below:

Show	Start Time
1st	2:00 p.m.
2nd	3:30 p.m.
3rd	5:00 p.m.
4th	?

If this pattern continues, what is the start time for the 4th show?

Ⓐ   5:30 p.m.

Ⓑ   6:00 p.m.

Ⓒ   6:30 p.m.

Ⓓ   7:00 p.m.

Item Number: M031051

Overall Percent Correct

Japan	90	▲
Singapore	88	▲
Hong Kong, SAR	86	▲
England	85	▲
Netherlands	83	▲
United States	83	▲
Belgium (Flemish)	81	▲
Australia	77	▲
Chinese Taipei	74	▲
New Zealand	74	▲
Scotland	74	▲
Lithuania	73	▲
Russian Federation	73	▲
Cyprus	72	▲
Hungary	69	O
Italy	68	O
Latvia	68	O
International average	**67**	
Moldova, Republic of	65	O
Slovenia	60	▼
Philippines	48	▼
Armenia	47	▼
Norway	45	▼
Iran, Islamic Republic of	33	▼
Morocco	31	▼
Tunisia	28	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
PATTERNS AND RELATIONSHIPS	Relationships	Knowing Facts and Procedures

Output of the number machine

A number machine takes a number and operates on it.
When the Input Number is 5, the Output Number is 9, as shown below.

Input Number: 5 $\times 2 \rightarrow$ 10 $+ 2 \rightarrow$ 12 $- 3 \rightarrow$ 9 : Output Number
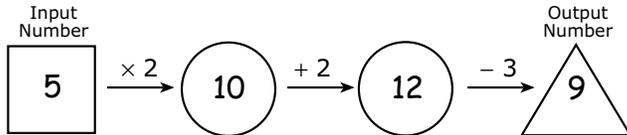
When the Input Number is 7, which of these is the Output Number?

(A) 11

(B) 13

(C) 14

(D) 25

Item Number: M031190

Overall Percent Correct

Belgium (Flemish)	72	▲
Hungary	71	▲
Singapore	69	▲
Japan	65	▲
Netherlands	65	▲
England	64	▲
Cyprus	62	▲
Italy	61	▲
Latvia	61	▲
Lithuania	61	▲
Hong Kong, SAR	55	▲
Moldova, Republic of	55	O
Russian Federation	55	O
Chinese Taipei	54	▲
International average	**50**	
Scotland	49	O
United States	48	O
New Zealand	45	▼
Australia	44	▼
Armenia	41	▼
Slovenia	36	▼
Norway	34	▼
Iran, Islamic Republic of	27	▼
Philippines	24	▼
Morocco	22	▼
Tunisia	18	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Reasoning

Heights of four girls on graph

The graph shows the heights of four girls.

The names are missing from the graph. Debbie is the tallest. Amy is the shortest. Dawn is taller than Sarah. How tall is Sarah?

Ⓐ   75 cm

Ⓑ   100 cm

Ⓒ   125 cm

Ⓓ   150 cm

Item Number: M012126

Overall Percent Correct

Singapore	84	▲
Latvia	83	▲
Belgium (Flemish)	82	▲
Hong Kong, SAR	81	▲
Russian Federation	81	▲
Chinese Taipei	78	▲
United States	78	▲
Japan	76	▲
Lithuania	76	▲
Netherlands	76	▲
Slovenia	76	▲
Australia	74	▲
Italy	74	▲
England	74	▲
Hungary	73	▲
New Zealand	70	O
Cyprus	68	O
International average	**67**	
Moldova, Republic of	66	O
Norway	63	O
Scotland	63	▼
Armenia	55	▼
Morocco	39	▼
Iran, Islamic Republic of	36	▼
Tunisia	32	▼
Philippines	31	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
DATA	Data Representation	Solving Routine Problems

Bar graph: which shows 45 bottles

Central School had a bottle collection. Children in each class brought empty bottles to school. The principal made a bar graph of the number of bottles from five classes.

Which class collected 45 bottles?

Ⓐ   Miss Barber's class

Ⓑ   Mr. Chyn's class

Ⓒ   Mrs. Friedman's class

Ⓓ   Mr. Mack's class

Item Number: M011009

Overall Percent Correct

Hong Kong, SAR	98	▲
Singapore	98	▲
Chinese Taipei	97	▲
Japan	97	▲
United States	97	▲
England	96	▲
Australia	95	▲
Netherlands	95	▲
Belgium (Flemish)	95	▲
New Zealand	93	▲
Scotland	92	▲
Latvia	90	▲
Lithuania	90	▲
Cyprus	89	▲
Hungary	88	▲
Slovenia	87	▲
Russian Federation	84	O
Norway	83	O
International average	**83**	
Italy	82	O
Moldova, Republic of	76	▼
Philippines	65	▼
Armenia	53	▼
Morocco	50	▼
Iran, Islamic Republic of	48	▼
Tunisia	32	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
DATA	Data Representation	Solving Routine Problems

Bar graph: which two show 80 bottles

Central School had a bottle collection. Children in each class brought empty bottles to school. The principal made a bar graph of the number of bottles from five classes.
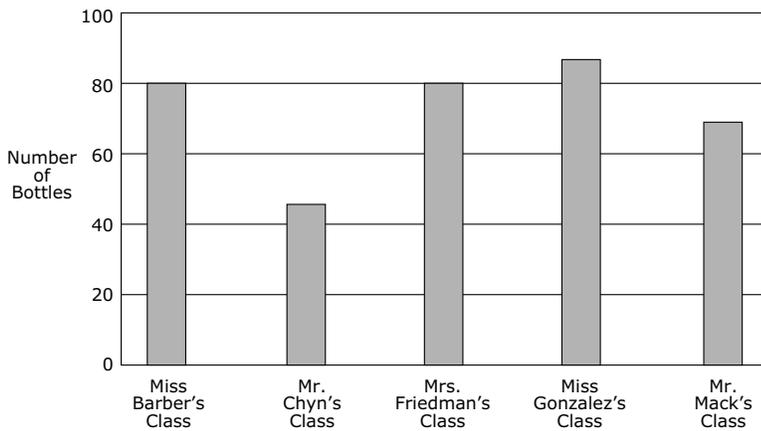
Which two classes collected exactly 80 bottles?

Ⓐ Miss Barber's and Mrs. Friedman's classes

Ⓑ Miss Barber's and Mr. Mack's classes

Ⓒ Mrs. Friedman's and Miss Gonzalez's classes

Ⓓ Miss Gonzalez's and Mr. Mack's classes

Item Number: M011012

Overall Percent Correct

Hong Kong, SAR	98	▲
Singapore	97	▲
United States	96	▲
Netherlands	92	▲
Belgium (Flemish)	91	▲
Australia	89	▲
Chinese Taipei	88	▲
Slovenia	88	▲
Cyprus	85	▲
Japan	85	▲
Italy	84	▲
New Zealand	84	▲
England	84	▲
Scotland	81	O
Latvia	80	O
Russian Federation	80	O
Hungary	78	O
International average	**78**	
Norway	76	O
Lithuania	75	O
Moldova, Republic of	75	O
Philippines	64	▼
Armenia	50	▼
Iran, Islamic Republic of	48	▼
Morocco	48	▼
Tunisia	35	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	A

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Solving Routine Problems

Highest temperature on chart

This chart shows temperature readings made at different times on four days.

TEMPERATURES					
	6 a.m.	9 a.m.	Noon	3 p.m.	8 p.m.
Monday	15°	17°	20°	21°	19°
Tuesday	15°	15°	15°	10°	9°
Wednesday	8°	10°	14°	13°	15°
Thursday	8°	11°	14°	17°	20°

When was the highest temperature recorded?

Ⓐ Noon on Monday

Ⓑ 3 p.m. on Monday

Ⓒ Noon on Tuesday

Ⓓ 3 p.m. on Wednesday

Item Number: M012078

Overall Percent Correct

Japan	95	▲
Chinese Taipei	90	▲
Hong Kong, SAR	89	▲
Netherlands	89	▲
Hungary	86	▲
Singapore	85	▲
United States	85	▲
England	85	▲
Belgium (Flemish)	85	▲
Italy	82	▲
Lithuania	81	▲
Scotland	81	▲
Australia	80	▲
Russian Federation	80	▲
Latvia	79	▲
New Zealand	78	▲
Slovenia	76	O
International average	**74**	
Norway	73	O
Cyprus	70	O
Moldova, Republic of	65	▼
Armenia	53	▼
Philippines	50	▼
Iran, Islamic Republic of	42	▼
Morocco	34	▼
Tunisia	31	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
DATA	Data Representation	Solving Routine Problems

Colors of students' hair on the graph

In a class of 30 students, 10 have black hair, 15 have blonde hair, and the rest have brown hair. Complete the graph below to show the number of students with brown hair.

Color of Hair

Overall Percent Correct

Netherlands	93	▲
Belgium (Flemish)	93	▲
Chinese Taipei	92	▲
Hong Kong, SAR	92	▲
Japan	90	▲
Singapore	90	▲
Latvia	88	▲
Lithuania	87	▲
England	86	▲
Hungary	84	▲
Scotland	83	▲
Russian Federation	82	▲
United States	82	▲
Cyprus	80	▲
New Zealand	80	▲
Slovenia	79	▲
Australia	76	O
Norway	75	O
International average	**73**	
Italy	71	O
Moldova, Republic of	67	▼
Armenia	50	▼
Philippines	29	▼
Iran, Islamic Republic of	28	▼
Morocco	24	▼
Tunisia	21	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Item Number: M031264

SCORING

Correct Response

• Bar for brown hair drawn to the horizontal line at 5

Incorrect Response

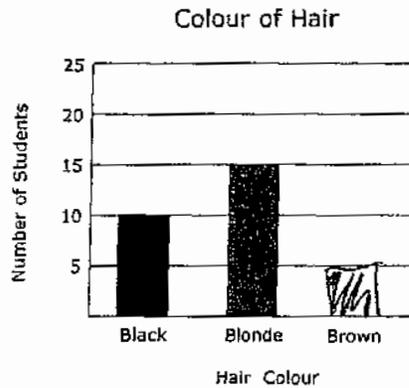• Incorrect (including crossed out/erased, stray marks, illegible, or off task)

Colors of students' hair on the graph (continued)

Item Number: M031264

Student Responses

Correct Response:

In a class of 30 students, 10 have black hair, 15 have blonde hair, and the rest have brown hair. Complete the bar graph below to show the number of students with brown hair.

Incorrect Response:

In a class of 30 students, 10 have black hair, 15 have blonde hair, and the rest have brown hair.

Complete the graph below to show the number of students with brown hair.
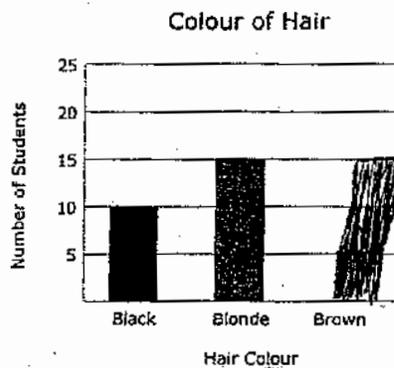
Content Domain	Main Topic	Cognitive Domain
DATA	Data Representation	Solving Routine Problems

How many more pencils than rulers sold

A store owner decided to check how many pens, pencils, erasers, and rulers were sold on the day school opened. He made the tally chart below.

Pens	Pencils	Erasers	Rulers
卌 卌 卌 卌 ||	卌 卌 卌 卌 卌		卌 卌 ||	卌 卌 卌 卌 ||||

How many more pencils than rulers were sold?

Answer: _____

Item Number: M031265

Overall Percent Correct

Japan	89	▲
England	73	▲
Belgium (Flemish)	72	▲
Netherlands	70	▲
United States	70	▲
Singapore	69	▲
Australia	66	▲
Scotland	62	▲
New Zealand	60	▲
Norway	55	▲
Latvia	46	▲
Cyprus	44	O
International average	**39**	
Hong Kong, SAR	36	O
Chinese Taipei	35	O
Lithuania	22	▼
Armenia	18	▼
Philippines	16	▼
Italy	10	▼
Moldova, Republic of	7	▼
Russian Federation	6	▼
Slovenia	5	▼
Tunisia	4	▼
Morocco	3	▼
Iran, Islamic Republic of	2	▼
Hungary	0	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• 2 more pencils than rulers

Incorrect Response

• 1 more pencil than rulers

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

How many more pencils than rulers sold (continued)

Item Number: M031265

Student Responses

Correct Response:

A store owner decided to check how many pens, pencils, erasers, and rulers were sold on the day school opened. He made the tally chart below.

Pens	Pencils	Erasers	Rulers
㼷 㼷 㼷 㼷 II	㼷 㼷 㼷 㼷 㼷 I	㼷 㼷 II	㼷 㼷 㼷 㼷 IIII

How many more pencils than rulers were sold?

Answer: ___TWO___

Incorrect Response:

A store owner decided to check how many pens, pencils, erasers, and rulers were sold on the day school opened. He made the tally chart below.

Pens	Pencils	Erasers	Rulers
㼷 㼷 㼷 㼷 II	㼷 㼷 㼷 㼷 㼷 I	㼷 㼷 II	㼷 㼷 㼷 㼷 㼷

How many more pencils than rulers were sold?

pencils/rulers

Answer: ___26 / 24___

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

High and low temperatures for a week

Temperature for Week

The graph above shows the daily high and low temperatures for a week.

On which day is the difference between the high and low temperatures the greatest?

Ⓐ Monday

Ⓑ Thursday

Ⓒ Friday

Ⓓ Saturday

Item Number: M031333

Overall Percent Correct

Japan	73	▲
Hong Kong, SAR	69	▲
Belgium (Flemish)	68	▲
Chinese Taipei	57	▲
Lithuania	56	▲
Netherlands	56	▲
England	53	▲
Latvia	48	O
Singapore	47	▲
Russian Federation	44	O
International average	**42**	
Hungary	41	O
Cyprus	40	O
Moldova, Republic of	39	O
Scotland	39	O
New Zealand	38	O
Slovenia	38	O
United States	38	▼
Italy	37	O
Australia	34	▼
Norway	32	▼
Philippines	30	▼
Morocco	25	▼
Armenia	22	▼
Iran, Islamic Republic of	16	▼
Tunisia	13	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	**A**

Content Domain	Main Topic	Cognitive Domain
DATA	Data Representation	Using Concepts

The favorite ice creams of 30 students

Favorite Ice Cream	Number of Students
Butterscotch	IIII
Chocolate	̶H̶H̶ ̶H̶H̶
Strawberry	̶H̶H̶ IIII
Vanilla	̶H̶H̶ II

A teacher asked 30 students in her class the flavor of their favorite ice cream. The table above shows how the teacher recorded the students' responses.

In the bar graph below, which ice cream flavor corresponds to the bar that is labeled X?

Favorite Ice Cream
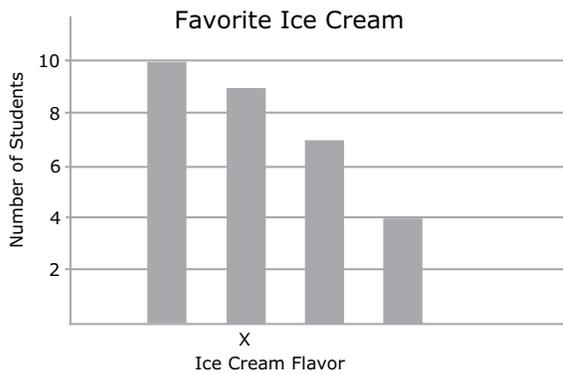
(A)　butterscotch

(B)　chocolate

(C)　strawberry

(D)　vanilla

Item Number: M031315

Overall Percent Correct

Japan	90	▲
Singapore	82	▲
England	75	▲
Netherlands	72	▲
United States	69	▲
Hong Kong, SAR	65	▲
Chinese Taipei	61	▲
Scotland	60	▲
New Zealand	59	▲
Belgium (Flemish)	58	▲
Australia	57	▲
Cyprus	53	▲
Latvia	50	O
International average	**47**	
Hungary	41	▼
Lithuania	37	▼
Norway	36	▼
Russian Federation	33	▼
Italy	30	▼
Moldova, Republic of	25	▼
Philippines	25	▼
Iran, Islamic Republic of	24	▼
Morocco	24	▼
Slovenia	22	▼
Armenia	19	▼
Tunisia	15	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Knowing Facts and Procedures

Congruent figures

Figures that are the same size and shape are called congruent figures.

Which two figures are congruent?

Ⓐ 1 and 2

Ⓑ 1 and 3

Ⓒ 1 and 4

Ⓓ 3 and 4

Item Number: M011014

Overall Percent Correct

Latvia	96	▲
Lithuania	95	▲
Slovenia	94	▲
United States	94	▲
Japan	93	▲
Russian Federation	93	▲
Singapore	93	▲
Belgium (Flemish)	93	▲
Chinese Taipei	92	▲
Netherlands	92	▲
Hong Kong, SAR	90	▲
Italy	89	▲
England	89	▲
Scotland	88	O
Australia	87	O
Hungary	87	O
New Zealand	86	O
Norway	86	O
International average	**85**	
Cyprus	83	O
Moldova, Republic of	83	O
Iran, Islamic Republic of	69	▼
Armenia	68	▼
Morocco	67	▼
Philippines	60	▼
Tunisia	59	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Knowing Facts and Procedures

Shade in two triangles of different sizes
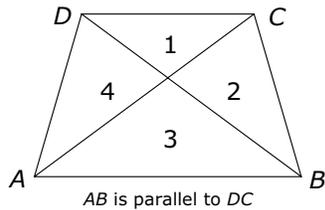
AB is parallel to DC

Two of the four triangles in the figure above are the same shape but different sizes. Shade in those two triangles.

Overall Percent Correct

Chinese Taipei	66	▲
Japan	63	▲
Singapore	62	▲
United States	57	▲
England	57	▲
Russian Federation	53	▲
Australia	52	▲
Hungary	51	▲
New Zealand	51	▲
Belgium (Flemish)	51	▲
Lithuania	50	▲
Scotland	50	▲
Cyprus	49	▲
Hong Kong, SAR	48	▲
Italy	46	O
Slovenia	45	O
International average	**43**	
Moldova, Republic of	39	O
Netherlands	39	O
Latvia	28	▼
Armenia	26	▼
Iran, Islamic Republic of	24	▼
Norway	23	▼
Philippines	17	▼
Morocco	13	▼
Tunisia	11	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Item Number: M031267

SCORING

Correct Response

• Triangles 1 and 3

Incorrect Response

• Triangles 2 and 4

• Triangles 1 and 2; Triangles 3 and 4; Triangles 1 and 4; OR Triangles 2 and 3

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

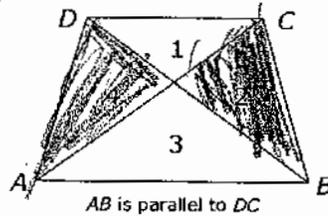Shade in two triangles of different sizes (continued)

Item Number: M031267

Student Responses
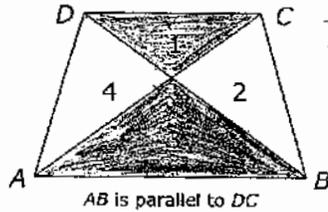
Correct Response:

AB is parallel to DC

Two of the four triangles in the figure above are the same shape but different sizes. Shade in those two triangles.

Incorrect Response:

AB is parallel to DC

Two of the four triangles in the figure above are the same shape but different sizes. Shade in those two triangles.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Knowing Facts and Procedures

Draw a line on the grid parallel to line L

On the grid, draw a line parallel to line *L*.

Overall Percent Correct

Singapore	94	▲
Belgium (Flemish)	91	▲
Moldova, Republic of	74	▲
United States	72	▲
Italy	69	▲
Hong Kong, SAR	63	▲
Chinese Taipei	58	▲
Hungary	58	▲
England	56	O
Armenia	51	O
Iran, Islamic Republic of	50	O
International average	**50**	
Russian Federation	48	O
Australia	47	O
Japan	46	▼
Cyprus	43	▼
New Zealand	42	▼
Lithuania	40	▼
Morocco	36	▼
Norway	36	▼
Latvia	34	▼
Slovenia	34	▼
Philippines	33	▼
Netherlands	32	▼
Tunisia	29	▼
Scotland	22	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031327

SCORING

Correct Response

• Line (or lines) parallel to L

Incorrect Response

• Line perpendicular to L shown

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

Draw a line on the grid parallel to line L (continued)
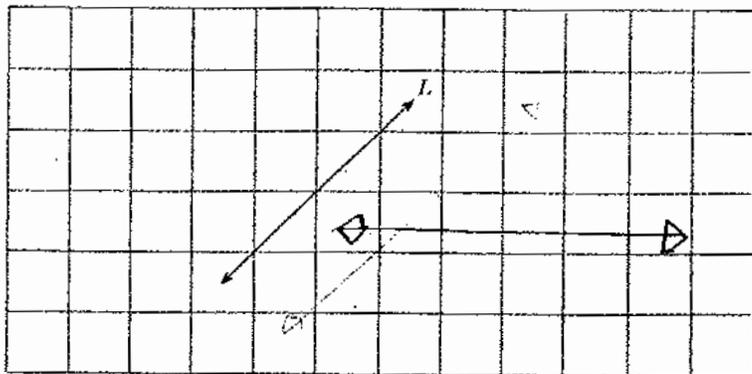
Item Number: M031327

Student Responses

Correct Response:

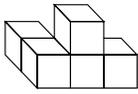On the grid, draw a line parallel to line *L*.
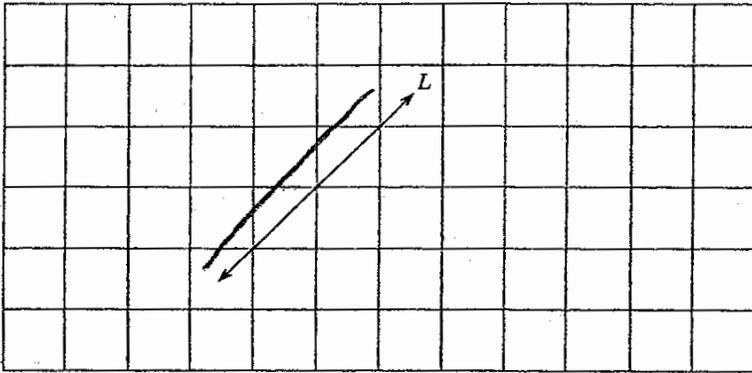
Incorrect Response:

On the grid, draw a line parallel to line *L*.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Reasoning

Rotated 3-dimensional figure
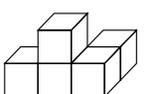
This figure will be turned to a different position.

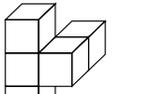Which of these could be the figure after it is turned?

Ⓐ   Ⓑ   Ⓒ   Ⓓ

Item Number: M012069
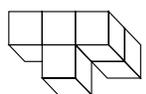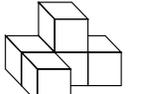
Overall Percent Correct

Norway	60	▲
Latvia	59	▲
Chinese Taipei	57	▲
Singapore	54	▲
Belgium (Flemish)	52	▲
Slovenia	51	▲
Hungary	50	▲
Italy	49	▲
Japan	49	▲
Scotland	49	▲
England	46	O
New Zealand	45	O
Hong Kong, SAR	43	O
International average	**43**	
Australia	42	O
Russian Federation	41	O
Netherlands	40	O
Moldova, Republic of	39	O
United States	39	▼
Tunisia	35	▼
Armenia	34	▼
Lithuania	32	▼
Cyprus	31	▼
Iran, Islamic Republic of	26	▼
Philippines	23	▼
Morocco	20	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	A

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures

Which has flat and curved surface

Here is a cone. Part of its surface is flat and part of its surface is curved.
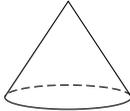
Which of these solids also has both a flat surface and a curved surface?

Ⓐ   Ⓑ   Ⓒ   Ⓓ

Item Number: M011006
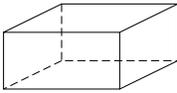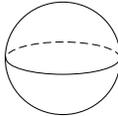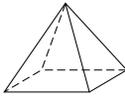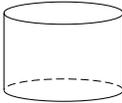
Overall Percent Correct

England	83	▲
Australia	81	▲
Scotland	81	▲
United States	74	▲
New Zealand	73	▲
Singapore	72	▲
Italy	71	▲
Slovenia	68	▲
Belgium (Flemish)	66	▲
Hungary	64	▲
Chinese Taipei	62	▲
Hong Kong, SAR	56	O
International average	**55**	
Netherlands	53	O
Moldova, Republic of	52	O
Armenia	49	▼
Japan	48	▼
Lithuania	46	▼
Cyprus	45	▼
Latvia	42	▼
Russian Federation	39	▼
Norway	35	▼
Iran, Islamic Republic of	31	▼
Tunisia	31	▼
Morocco	30	▼
Philippines	26	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures

Statements about triangle

All of the pupils in a class cut out paper shapes. The teacher picked one out and said, "This shape is a triangle." Which of these statements MUST be correct?

- Ⓐ The shape has three sides.
- Ⓑ The shape has a right angle.
- Ⓒ The shape has equal sides.
- Ⓓ The shape has equal angles.

Item Number: M011022

Overall Percent Correct

Australia	79	▲
Latvia	82	▲
Netherlands	82	▲
Singapore	82	▲
Chinese Taipei	81	▲
Hong Kong, SAR	81	▲
Russian Federation	81	▲
Italy	79	▲
New Zealand	79	▲
United States	79	▲
England	79	▲
Moldova, Republic of	74	O
Belgium (Flemish)	74	▲
Lithuania	73	O
Scotland	72	O
Cyprus	71	O
International average	**71**	
Norway	70	O
Armenia	68	O
Japan	68	O
Slovenia	66	O
Iran, Islamic Republic of	61	▼
Hungary	58	▼
Philippines	48	▼
Morocco	47	▼
Tunisia	33	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response: A

28

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures

Indicates geometric shapes in the picture

In the picture there are a number of geometric shapes, like circles, squares, rectangles, and triangles. For example, the sun looks like a circle.

Draw lines to three other different objects in the picture and write what shapes they look like.

Overall Percent Correct

Belgium (Flemish)	81	▲
Chinese Taipei	80	▲
New Zealand	74	▲
England	72	▲
Australia	71	▲
Hong Kong, SAR	70	▲
United States	70	▲
Italy	68	▲
Japan	68	▲
Moldova, Republic of	68	▲
Cyprus	67	▲
Latvia	67	▲
Netherlands	67	▲
Singapore	66	▲
Scotland	64	▲
Russian Federation	62	O
Hungary	60	O
Slovenia	60	O
International average	**59**	
Lithuania	57	O
Norway	45	▼
Armenia	35	▼
Iran, Islamic Republic of	30	▼
Philippines	26	▼
Tunisia	23	▼
Morocco	11	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Item Number: M031269

SCORING

Fully Correct Response

• Any three of square, rectangle, triangle, trapezoid, diamond/rhombus, kite correctly identified
• Any two of the above plus circle

Partially Correct Response

• Any two of the above correctly identified
• Any one of the above plus circle

Incorrect Response

• Incorrect (including crossed out/erased, stray marks, illegible or off task)
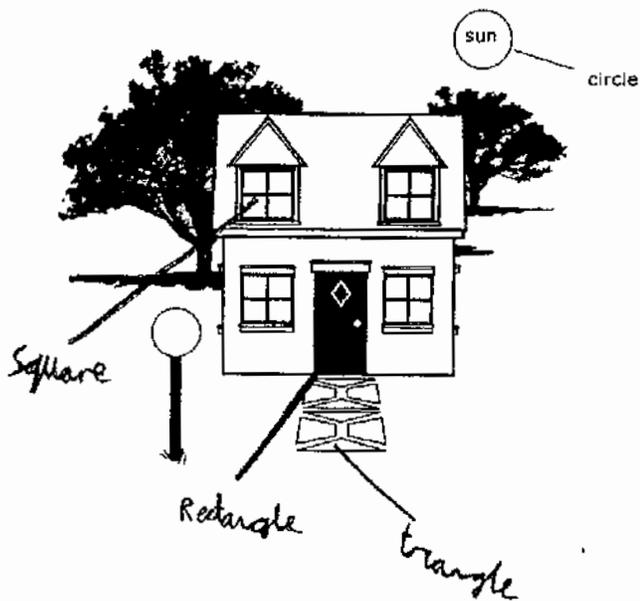
Indicates geometric shapes in the picture (continued)

Item Number: M031269

Student Responses

Fully Correct Response:

In the picture there are a number of geometric shapes, such as circles, squares, rectangles, and triangles. For example, the sun looks like a circle.

Draw lines to three other different objects in the picture and write the name of the shape they look like.
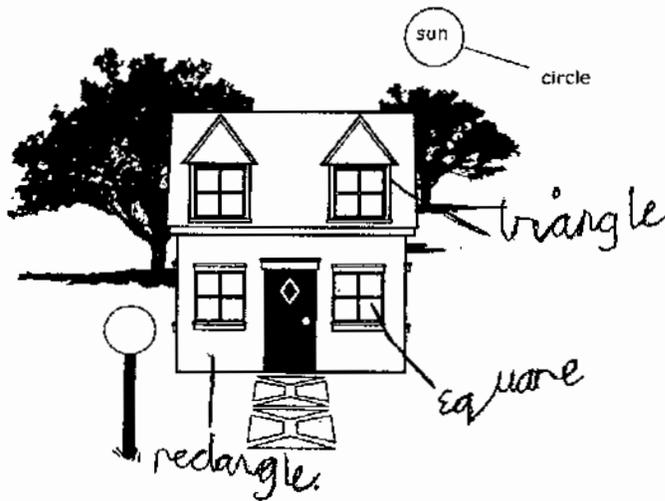
Indicates geometric shapes in the picture (continued)

Item Number: M031269

Student Responses (continued)

Partially Correct Response:

In the picture there are a number of geometric shapes, such as circles, squares, rectangles, and triangles. For example, the sun looks like a circle.

Draw lines to three other different objects in the picture and write the name of the shape they look like.

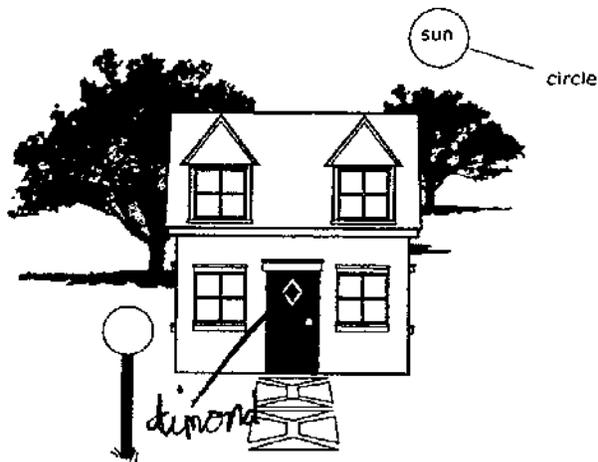## Indicates geometric shapes in the picture (continued)

Item Number: M031269

Student Responses (continued)

Incorrect Response:

In the picture there are a number of geometric shapes, such as circles, squares, rectangles, and triangles. For example, the sun looks like a circle.

Draw lines to three other different objects in the picture and write the name of the shape they look like.
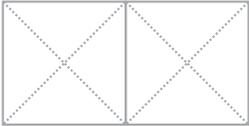
| Content Domain	Main Topic	Cognitive Domain
A. GEOMETRY	**Two- and Three-Dimensional Shapes**	**Knowing Facts and Procedures**
B. GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures
C. NUMBER	Fractions and Decimals	Knowing Facts and Procedures

Geometry tiles: black triangle

A. Use 2 of the triangle tiles to make one large black triangle. Then show what you did with your tiles by shading in your triangle below.

Shade in Your Triangle Here

B. Use all 4 triangle tiles to make a black square. Then show what you did with your tiles by shading in your square below.

Shade in Your Square Here

C. What fraction of the figure is shaded in part B above?

Answer: _____

Item Number: M031347A
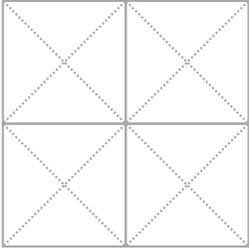
Overall Percent Correct

Japan	78	▲
Latvia	64	▲
Lithuania	61	▲
Russian Federation	61	▲
Hong Kong, SAR	60	▲
Italy	59	▲
Chinese Taipei	57	▲
Netherlands	55	▲
Cyprus	54	▲
New Zealand	52	▲
England	52	▲
Belgium (Flemish)	52	▲
Australia	51	▲
Norway	50	O
Scotland	48	O
Slovenia	47	O
International average	**45**	
Singapore	44	O
United States	42	O
Hungary	41	O
Moldova, Republic of	38	▼
Armenia	15	▼
Tunisia	11	▼
Philippines	10	▼
Iran, Islamic Republic of	9	▼
Morocco	6	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

 or

Incorrect Response

- Used two triangle tiles but created two small black triangles
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Geometry tiles: black triangle (continued)

Item Number: M031347A

Student Responses

Correct Response:

A. Use 2 of the triangle tiles to make one large black triangle. Then show what you did with your tiles by shading in your triangle below.
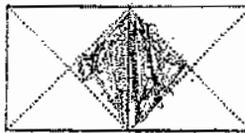
Shade in Your Triangle Here

Incorrect Response:

A. Use 2 of the triangle tiles to make one large black triangle. Then show what you did with your tiles by shading in your triangle below.

Shade in Your Triangle Here

Content Domain	Main Topic	Cognitive Domain
A. GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures
B. GEOMETRY	**Two- and Three-Dimensional Shapes**	**Knowing Facts and Procedures**
C. NUMBER	Fractions and Decimals	Knowing Facts and Procedures

Geometry tiles: black square

A. Use 2 of the triangle tiles to make one large black triangle. Then show what you did with your tiles by shading in your triangle below.
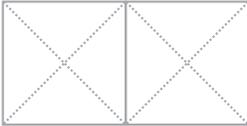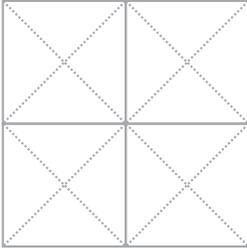
Shade in Your Triangle Here

B. Use all 4 triangle tiles to make a black square. Then show what you did with your tiles by shading in your square below.

Shade in Your Square Here

C. What fraction of the figure is shaded in part B above?

Answer: _____

Item Number: M031347B

Overall Percent Correct

Japan	71	▲
Netherlands	60	▲
Lithuania	57	▲
Russian Federation	57	▲
Belgium (Flemish)	55	▲
Chinese Taipei	54	▲
England	54	▲
Australia	52	▲
New Zealand	52	▲
Italy	51	▲
Scotland	48	▲
Cyprus	47	▲
Norway	47	O
Hong Kong, SAR	46	▲
Hungary	45	O
Singapore	45	O
Slovenia	44	O
United States	42	O
International average	**42**	
Moldova, Republic of	37	O
Latvia	33	▼
Tunisia	15	▼
Iran, Islamic Republic of	13	▼
Armenia	10	▼
Philippines	7	▼
Morocco	5	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

Incorrect Response

- Used four triangle tiles but did not create a black square
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

35

Geometry tiles: black square (continued)

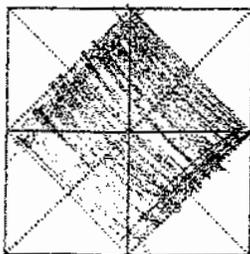*Item Number: M031347B*

Student Responses

Correct Response:

B. Use all 4 triangle tiles to make a black square. Then show what you did with your tiles by shading in your square below.
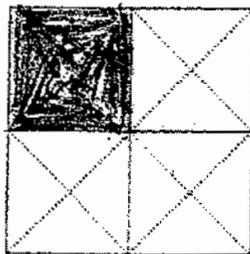
Shade in Your Square Here

Incorrect Response:

B. Use all 4 triangle tiles to make a black square. Then show what you did with your tiles by shading in your square below.

Shade in Your Square Here

Content Domain	Main Topic	Cognitive Domain
A. GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures
B. GEOMETRY	Two- and Three-Dimensional Shapes	Knowing Facts and Procedures
C. NUMBER	**Fractions and Decimals**	**Knowing Facts and Procedures**

Geometry tiles: fraction shaded

A. Use 2 of the triangle tiles to make one large black triangle. Then show what you did with your tiles by shading in your triangle below.

Shade in Your Triangle Here

B. Use all 4 triangle tiles to make a black square. Then show what you did with your tiles by shading in your square below.
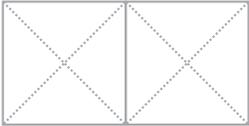
Shade in Your Square Here

C. What fraction of the figure is shaded in part B above?

Answer: _____

Item Number: M031347C

Overall Percent Correct

Singapore	73	▲
Hong Kong, SAR	70	▲
Chinese Taipei	61	▲
Japan	56	▲
England	49	▲
United States	48	▲
Cyprus	45	▲
Belgium (Flemish)	45	▲
Hungary	38	▲
Netherlands	38	▲
New Zealand	36	O
Australia	34	O
International average	**33**	
Latvia	28	▼
Scotland	28	▼
Italy	26	▼
Lithuania	24	▼
Norway	23	▼
Russian Federation	21	▼
Slovenia	18	▼
Iran, Islamic Republic of	17	▼
Moldova, Republic of	17	▼
Philippines	14	▼
Armenia	5	▼
Tunisia	3	▼
Morocco	1	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼
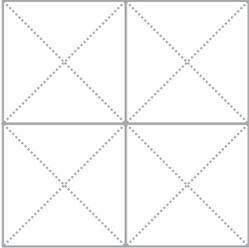
SCORING

Correct Response

- ½ or equivalent
- Correct fraction based on incorrect figure in part

Incorrect Response

- ¼
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Geometry tiles: fraction shaded (continued)

Item Number: M031347C

Student Responses

Correct Response:

C. What fraction of the figure is shaded in part B above?

Answer: $\frac{1}{4}$

Incorrect Response:

C. What fraction of the figure is shaded in part B above?

Answer: the middle of it because I could see 1 square

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three-Dimensional Shapes	Solving Routine Problems

Draw line on rectangle/2 triangles

A. Draw 1 straight line on this rectangle to divide it into 2 triangles.

B. Draw 1 straight line on this rectangle to divide it into 2 rectangles.

C. Draw 2 straight lines on this rectangle to divide it into 1 rectangle and 2 triangles.

Item Number: M031272A

Overall Percent Correct

Country		
Hong Kong, SAR	95	▲
Chinese Taipei	93	▲
Japan	92	▲
Latvia	92	▲
Russian Federation	91	▲
Lithuania	90	▲
Moldova, Republic of	83	▲
Singapore	83	▲
Belgium (Flemish)	83	▲
Netherlands	82	▲
Cyprus	80	▲
New Zealand	80	▲
England	80	▲
Hungary	79	▲
Australia	79	O
Slovenia	79	O
Scotland	79	▲
International average	**75**	
Italy	74	O
United States	74	O
Norway	68	▼
Armenia	57	▼
Iran, Islamic Republic of	55	▼
Tunisia	50	▼
Morocco	40	▼
Philippines	21	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• One diagonal drawn

Incorrect Response

• One horizontal or vertical line drawn

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

Draw line on rectangle/2 triangles (continued)

Item Number: M031272A

Student Responses

Correct Response:

A. Draw 1 straight line on this rectangle to make 2 triangles.
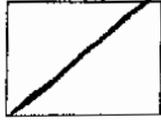
Incorrect Response:

A. Draw 1 straight line on this rectangle to make 2 triangles.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three-Dimensional Shapes	Solving Routine Problems

Draw line on rectangle/2 rectangles

A. Draw 1 straight line on this rectangle to divide it into 2 triangles.

B. Draw 1 straight line on this rectangle to divide it into 2 rectangles.

C. Draw 2 straight lines on this rectangle to divide it into 1 rectangle and 2 triangles.

Item Number: M031272B

Overall Percent Correct

Hong Kong, SAR	99	▲
Chinese Taipei	95	▲
Singapore	94	▲
Latvia	93	▲
Lithuania	92	▲
Russian Federation	92	▲
Australia	91	▲
Japan	91	▲
Belgium (Flemish)	91	▲
Hungary	89	▲
New Zealand	89	▲
Slovenia	89	▲
England	89	▲
Scotland	89	▲
United States	88	▲
Cyprus	86	▲
Italy	86	▲
Netherlands	85	O
Moldova, Republic of	84	O
International average	**83**	
Iran, Islamic Republic of	76	▼
Norway	74	▼
Armenia	58	▼
Tunisia	58	▼
Morocco	52	▼
Philippines	34	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• One horizontal or vertical line drawn

Incorrect Response

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

Draw line on rectangle/2 rectangles (continued)

Item Number: M031272B

Student Responses

Correct Response:

B. Draw 1 straight line on this rectangle to make 2 rectangles.

Incorrect Response:

B. Draw 1 straight line on this rectangle to make 2 rectangles.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three-Dimensional Shapes	Solving Routine Problems

Draw line on rectangle/1 rectangle, 2 triangles

A. Draw 1 straight line on this rectangle to divide it into 2 triangles.

B. Draw 1 straight line on this rectangle to divide it into 2 rectangles.

C. Draw 2 straight lines on this rectangle to divide it into 1 rectangle and 2 triangles.

Overall Percent Correct

Hong Kong, SAR	85	▲
Chinese Taipei	84	▲
Japan	75	▲
Singapore	71	▲
Russian Federation	68	▲
Latvia	66	▲
Cyprus	59	▲
Lithuania	59	▲
Hungary	52	▲
Belgium (Flemish)	52	▲
Netherlands	50	O
Australia	47	O
International average	**47**	
Moldova, Republic of	45	O
England	45	O
New Zealand	44	O
Slovenia	44	O
Scotland	41	▼
Armenia	35	▼
United States	34	▼
Italy	33	▼
Norway	27	▼
Tunisia	20	▼
Morocco	16	▼
Iran, Islamic Republic of	15	▼
Philippines	11	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031272C

SCORING

Correct Response

- Two lines correctly drawn to show a smaller rectangle and two triangles

Incorrect Response

- Attempt made with two lines drawn but drawing does not show a line dividing the rectangle into 2 rectangles with a diagonal accurately drawn in one of them
- Other incorrect (including crossed out/erased, stray marks, illegible or off task)

Draw line on rectangle/1rectangle, 2 triangles (continued)

Item Number: M031272C

Student Responses

Correct Response:

C. Draw 2 straight lines on this rectangle to make 1 rectangle and 2 triangles.

Incorrect Response:

C. Draw 2 straight lines on this rectangle to make 1 rectangle and 2 triangles.

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

Weight of an adult

Which of these could be the weight (mass) of an adult?

- Ⓐ   1 kg
- Ⓑ   6 kg
- Ⓒ   60 kg
- Ⓓ   600 kg

Item Number: M011023

Overall Percent Correct

Chinese Taipei	91	▲
Singapore	90	▲
Japan	89	▲
Latvia	89	▲
Lithuania	88	▲
Netherlands	87	▲
Russian Federation	87	▲
Hungary	86	▲
Italy	82	▲
Hong Kong, SAR	81	▲
Moldova, Republic of	81	▲
Belgium (Flemish)	80	▲
Australia	79	▲
New Zealand	78	▲
Norway	78	▲
Armenia	76	▲
Cyprus	76	▲
International average	**72**	
Slovenia	61	▼
United States	54	▼
England	54	▼
Scotland	50	▼
Iran, Islamic Republic of	45	▼
Morocco	44	▼
Philippines	36	▼
Tunisia	32	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

Units to measure mass of egg

What units would be best to use to measure the weight (mass) of an egg?

- (A) centimeters
- (B) milliliters
- (C) grams
- (D) kilograms

Item Number: M012023

Overall Percent Correct

Japan	91	▲
Netherlands	88	▲
Cyprus	83	▲
Lithuania	82	▲
Singapore	82	▲
Latvia	81	▲
England	80	▲
Belgium (Flemish)	80	▲
Hong Kong, SAR	78	▲
Italy	77	▲
Hungary	76	▲
Russian Federation	75	▲
Moldova, Republic of	74	▲
International average	**69**	
Chinese Taipei	68	O
Australia	67	O
New Zealand	67	O
Armenia	65	O
Norway	59	▼
Slovenia	59	▼
Scotland	55	▼
United States	54	▼
Iran, Islamic Republic of	50	▼
Morocco	47	▼
Tunisia	43	▼
Philippines	40	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

Which could equal 150 milliliters

Which of these could equal 150 milliliters?

(A) The amount of water in a cup

(B) The length of a kitten

(C) The weight of an egg

(D) The area of a coin

Item Number: M031338

Overall Percent Correct

Chinese Taipei	87	▲
Hong Kong, SAR	86	▲
Lithuania	82	▲
Singapore	81	▲
Japan	75	▲
Hungary	74	▲
Russian Federation	72	▲
England	72	▲
Cyprus	71	▲
Latvia	69	▲
Belgium (Flemish)	69	▲
Italy	68	▲
Moldova, Republic of	68	▲
Slovenia	63	O
International average	**61**	
Australia	60	O
Scotland	60	O
Netherlands	59	O
New Zealand	55	▼
United States	48	▼
Armenia	41	▼
Norway	39	▼
Philippines	36	▼
Morocco	32	▼
Tunisia	28	▼
Iran, Islamic Republic of	25	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	A

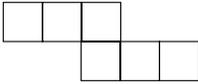| Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Reasoning

Which has largest area

Which of these figures has the largest area?

(A)
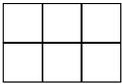
(B)

(C)

(D)
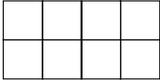
Item Number: M011005

Overall Percent Correct

Australia	85	▲
Chinese Taipei	96	▲
Japan	94	▲
Hong Kong, SAR	91	▲
Singapore	88	▲
Latvia	86	▲
Scotland	86	▲
Belgium (Flemish)	84	▲
Netherlands	83	▲
Russian Federation	82	O
Moldova, Republic of	81	O
United States	81	▲
Hungary	80	O
Lithuania	80	O
Armenia	79	O
Cyprus	79	O
Italy	79	O
New Zealand	79	O
England	78	O
International average	**78**	
Slovenia	77	O
Iran, Islamic Republic of	72	▼
Morocco	65	▼
Norway	65	▼
Tunisia	46	▼
Philippines	43	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Solving Routine Problems

The length of the films

Simon wants to watch a film that is between $1\frac{1}{2}$ and 2 hours long.

Which of the following films should he choose?

- Ⓐ   a 59-minute film
- Ⓑ   a 102-minute film
- Ⓒ   a 121-minute film
- Ⓓ   a 150-minute film

Item Number: M031008

Overall Percent Correct

Singapore	46	▲
England	42	▲
Hungary	41	▲
Netherlands	38	▲
Australia	37	▲
Hong Kong, SAR	37	▲
Russian Federation	37	▲
United States	34	▲
Belgium (Flemish)	33	O
Chinese Taipei	32	O
Lithuania	30	O
Slovenia	30	O
International average	**30**	
New Zealand	29	O
Norway	29	O
Scotland	28	O
Latvia	27	O
Italy	26	▼
Moldova, Republic of	26	O
Cyprus	25	▼
Japan	25	▼
Armenia	22	▼
Iran, Islamic Republic of	22	▼
Philippines	22	▼
Tunisia	17	▼
Morocco	16	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, techniques, and formulas	Knowing Facts and Procedures

How much did temperature rise

When Tracy left for school, the temperature was minus 3 degrees.
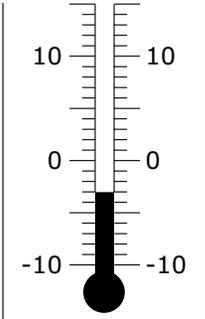
At recess, the temperature was 5 degrees.
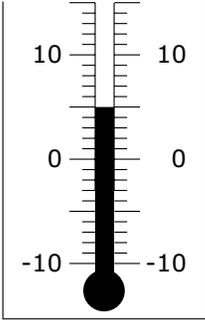
How many degrees did the temperature rise?

Item Number: M011013

Overall Percent Correct

Netherlands	78	▲
England	76	▲
Belgium (Flemish)	76	▲
Hungary	74	▲
Japan	71	▲
Latvia	70	▲
Italy	66	▲
Norway	65	▲
Lithuania	63	▲
Russian Federation	63	▲
Chinese Taipei	60	O
Scotland	59	O
Hong Kong, SAR	58	O
International average	**57**	
Cyprus	55	O
Moldova, Republic of	55	O
Slovenia	54	O
Singapore	53	▼
United States	52	▼
Armenia	51	▼
New Zealand	49	▼
Australia	46	▼
Iran, Islamic Republic of	46	▼
Philippines	44	▼
Morocco	29	▼
Tunisia	27	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, techniques, and formulas	Knowing Facts and Procedures

Draw a triangle with *AB* as the base
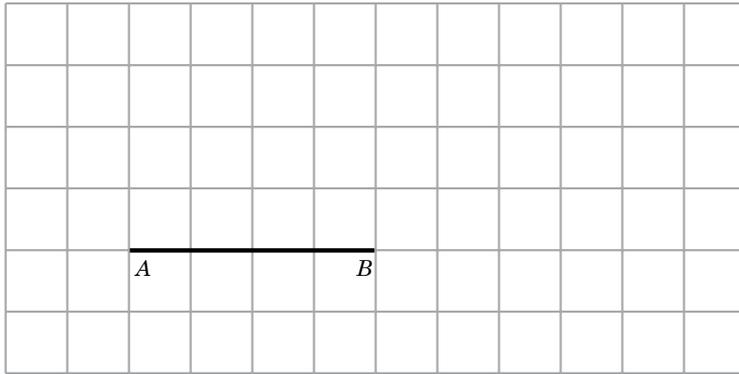
Draw a triangle in the grid so that the line *AB* is the base of the triangle and the two new sides are the same length as each other.

Overall Percent Correct

Hong Kong, SAR	95	▲
Latvia	84	▲
Japan	80	▲
New Zealand	80	▲
Australia	77	▲
Italy	77	▲
Russian Federation	77	▲
Singapore	77	▲
Belgium (Flemish)	77	▲
Lithuania	74	▲
England	73	▲
Hungary	72	▲
Scotland	71	O
Chinese Taipei	70	O
Moldova, Republic of	67	O
International average	**67**	
Slovenia	64	O
United States	63	▼
Norway	58	▼
Cyprus	57	▼
Armenia	56	▼
Iran, Islamic Republic of	48	▼
Philippines	45	▼
Morocco	42	▼
Tunisia	28	▼
Netherlands	0	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Item Number: M031322

SCORING

Correct Response

- Triangle with two new sides equal (i.e. meeting on or within 2mm of the gridline that is the perpendicular bisector of AB)

Incorrect Response

- Triangle with two new sides unequal
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Draw a triangle with *AB* as the base (continued)

Item Number: M031322

Student Responses
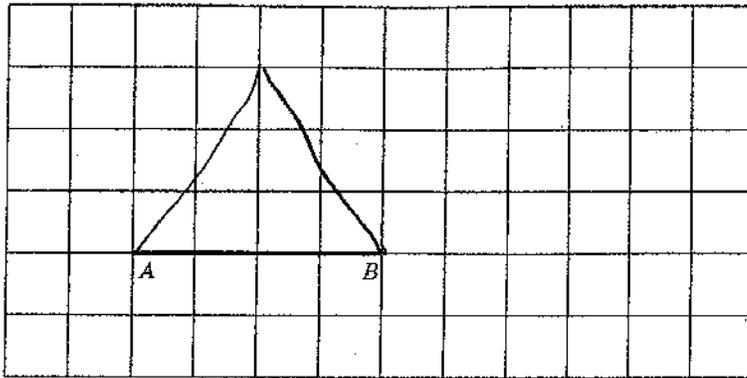
Correct Response:

Draw a triangle in the grid so that the line *AB* is the base of the triangle and the two new sides are the same length as each other.

Incorrect Response:

Draw a triangle in the grid so that the line *AB* is the base of the triangle and the two new sides are the same length as each other.

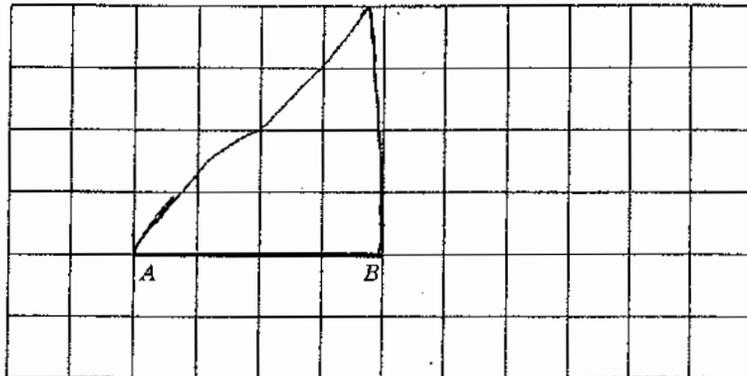| Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Reasoning

Distance on map

One centimeter on the map represents 8 kilometers on the land.

About how far apart are Oxford and Smithville on the land?

- (A)   4 km
- (B)   16 km
- (C)   35 km
- (D)   50 km

Item Number: M012065

Overall Percent Correct

Netherlands	69	▲
Singapore	62	▲
Japan	61	▲
Belgium (Flemish)	61	▲
Hong Kong, SAR	60	▲
Lithuania	59	▲
Latvia	57	▲
Hungary	55	▲
Russian Federation	52	▲
England	51	▲
Chinese Taipei	49	▲
Australia	46	O
New Zealand	45	O
International average	**45**	
Italy	44	O
Moldova, Republic of	44	O
United States	41	▼
Slovenia	38	▼
Cyprus	37	▼
Norway	36	▼
Scotland	35	▼
Armenia	33	▼
Morocco	26	▼
Iran, Islamic Republic of	21	▼
Tunisia	21	▼
Philippines	20	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	**C**

53

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Reasoning

Complete the figure with an area of 13 cm^2

The squares in the grid above have areas of 1 square centimeter. Draw lines to complete the figure so that it has an area of 13 square centimeters.

Item Number: M031298

Overall Percent Correct

Japan	68	▲
Chinese Taipei	66	▲
Hong Kong, SAR	52	▲
Latvia	43	▲
Singapore	43	▲
Lithuania	40	▲
Netherlands	37	▲
Moldova, Republic of	35	▲
Cyprus	34	▲
Russian Federation	30	O
Australia	29	O
England	29	O
Scotland	29	O
International average	**29**	
Belgium (Flemish)	28	O
Hungary	26	O
Armenia	25	O
United States	24	▼
Italy	22	▼
New Zealand	15	▼
Iran, Islamic Republic of	11	▼
Slovenia	11	▼
Norway	10	▼
Morocco	9	▼
Tunisia	9	▼
Philippines	5	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• Lines drawn to give area of 13 square cm

Incorrect Response

• Error due to counting half squares as full square centimeters

• One line drawn to close given figure

• Symmetrical figure drawn

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

Complete the figure with an area of 13 cm² (continued)

Item Number: M031298

Student Responses
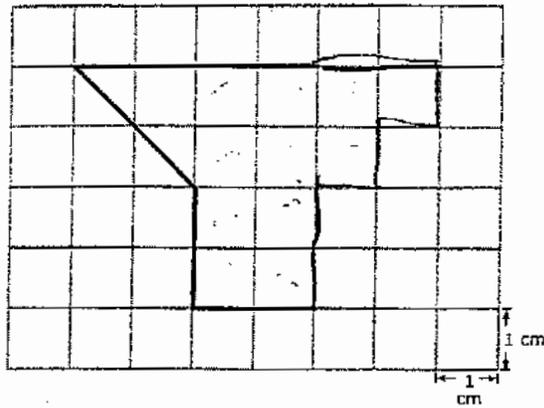
Correct Response:

The squares in the grid above have areas of 1 square centimeter. Draw lines to complete the figure so that it has an area of 13 square centimeters.

Incorrect Response:
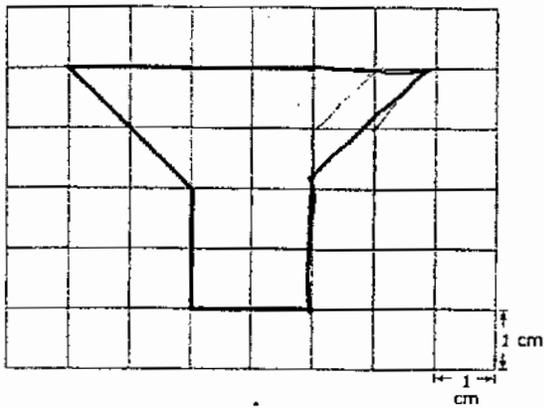
The squares in the grid above have areas of 1 square centimeter. Draw lines to complete the figure so that it has an area of 13 square centimeters.

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

When is Mary's trip

Here is a calendar for December.

DECEMBER						
S	**M**	**T**	**W**	**T**	**F**	**S**
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Mary's birthday is on Thursday, December 2. She is going on a trip exactly 3 weeks later. On what date will she go on the trip?

Ⓐ December 16th

Ⓑ December 21st

Ⓒ December 23rd

Ⓓ December 30th

Item Number: M011017

Overall Percent Correct

|		
Japan	83	▲
England	82	▲
Belgium (Flemish)	81	▲
Netherlands	79	▲
Scotland	79	▲
Hong Kong, SAR	76	▲
Australia	75	▲
Chinese Taipei	75	▲
Singapore	75	▲
United States	75	▲
New Zealand	74	▲
Latvia	69	▲
Hungary	67	O
Russian Federation	67	O
Italy	66	O
Slovenia	66	O
Lithuania	65	O
Moldova, Republic of	64	O
International average	**64**	
Norway	62	O
Cyprus	61	O
Armenia	51	▼
Philippines	36	▼
Iran, Islamic Republic of	31	▼
Morocco	26	▼
Tunisia	25	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

Perimeter of rectangle

Here is a rectangle with length 6 centimeters and width 4 centimeters. The distance right around its shape is called its perimeter.

6 cm

4 cm
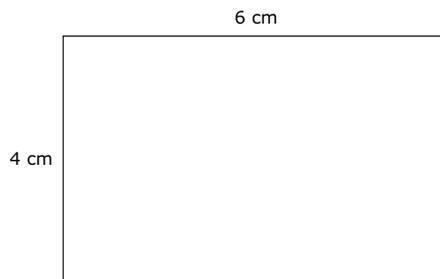
Which of these gives the perimeter of the rectangle in centimeters?

Ⓐ $6 + 4$

Ⓑ 6×4

Ⓒ $6 \times 4 \times 2$

Ⓓ $6 + 4 + 6 + 4$

Item Number: M011025

Overall Percent Correct

Singapore	93	▲
Latvia	77	▲
Lithuania	73	▲
Russian Federation	72	▲
Armenia	66	▲
United States	64	▲
Hong Kong, SAR	62	▲
Moldova, Republic of	62	▲
Belgium (Flemish)	61	▲
Australia	57	▲
Hungary	57	▲
Italy	57	▲
Cyprus	53	O
England	52	O
International average	**51**	
Chinese Taipei	42	▼
New Zealand	39	▼
Norway	39	▼
Philippines	39	▼
Scotland	36	▼
Netherlands	35	▼
Iran, Islamic Republic of	34	▼
Slovenia	33	▼
Japan	25	▼
Tunisia	25	▼
Morocco	21	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

Betty's average driving speed

The distance from one town to another is 180 km. If Betty has to drive the distance in 3 hours, what must her average speed be in kilometers per hour?

Ⓐ 180×3

Ⓑ $180 + 3$

Ⓒ $180 \div 3$

Ⓓ $180 - 3$

Item Number: M031097

Overall Percent Correct

Hong Kong, SAR	83	▲
Latvia	80	▲
Russian Federation	74	▲
Chinese Taipei	73	▲
Japan	73	▲
Lithuania	65	▲
Netherlands	62	▲
Singapore	59	▲
Belgium (Flemish)	56	▲
Armenia	54	▲
Hungary	53	O
Moldova, Republic of	53	O
International average	**48**	
Cyprus	39	▼
Slovenia	37	▼
United States	37	▼
England	36	▼
Italy	34	▼
New Zealand	32	▼
Australia	31	▼
Norway	30	▼
Scotland	29	▼
Tunisia	28	▼
Morocco	27	▼
Iran, Islamic Republic of	26	▼
Philippines	25	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

George practiced soccer 6 days a week

George practiced soccer six days a week.

For 3 of the days he practiced for 45 minutes each day.

For 3 of the days he practiced for 20 minutes each day.

In hours and minutes, what is the total amount of time George practiced on these six days?

Ⓐ   2 hours 20 minutes

Ⓑ   2 hours 55 minutes

Ⓒ   3 hours 5 minutes

Ⓓ   3 hours 15 minutes

Item Number: M031178

Overall Percent Correct

Singapore	64	▲
Chinese Taipei	61	▲
Russian Federation	57	▲
Japan	53	▲
Lithuania	53	▲
Hong Kong, SAR	50	▲
Latvia	49	▲
Hungary	44	▲
England	42	O
Belgium (Flemish)	41	O
International average	**37**	
United States	36	O
Moldova, Republic of	35	O
Armenia	34	O
Australia	33	O
Italy	33	O
Netherlands	33	O
Slovenia	32	O
Cyprus	31	▼
New Zealand	28	▼
Scotland	27	▼
Norway	24	▼
Morocco	17	▼
Philippines	15	▼
Iran, Islamic Republic of	13	▼
Tunisia	11	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Using Concepts

Volume of stack of cubes

Jasmine made a stack of cubes of the same size. The stack had 5 layers and each layer had 10 cubes. What is the volume of the stack?

- Ⓐ   5 cubes
- Ⓑ   15 cubes
- Ⓒ   30 cubes
- Ⓓ   50 cubes

Item Number: M011010

Overall Percent Correct

Chinese Taipei	93	▲
Hong Kong, SAR	91	▲
Netherlands	85	▲
Singapore	85	▲
Russian Federation	82	▲
Lithuania	80	▲
Latvia	79	▲
Belgium (Flemish)	75	▲
Japan	73	▲
Moldova, Republic of	70	▲
Italy	67	O
United States	67	▲
England	65	O
Hungary	64	O
International average	**63**	
Australia	61	O
Cyprus	61	O
Scotland	60	O
New Zealand	56	▼
Armenia	53	▼
Slovenia	53	▼
Norway	46	▼
Iran, Islamic Republic of	36	▼
Morocco	29	▼
Tunisia	28	▼
Philippines	26	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

Sum of two numbers with decimals

What is the sum of 2.5 and 3.8?

(A) 5.3

(B) 6.3

(C) 6.4

(D) 9.5

Item Number: M011008

Overall Percent Correct

Singapore	97	▲
Chinese Taipei	97	▲
Japan	96	▲
Belgium (Flemish)	91	▲
Lithuania	87	▲
Hong Kong, SAR	86	▲
Netherlands	85	▲
Italy	77	▲
England	73	▲
United States	72	▲
Russian Federation	72	O
Hungary	72	▲
Moldova, Republic of	69	O
Latvia	69	O
International average	**67**	
Armenia	67	O
Philippines	62	▼
Australia	58	▼
Scotland	55	▼
Cyprus	52	▼
New Zealand	49	▼
Slovenia	48	▼
Norway	45	▼
Morocco	42	▼
Iran, Islamic Republic of	37	▼
Tunisia	31	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

Subtraction with decimals

Subtract: 4.03
              −1.15

Ⓐ 5.18

Ⓑ 4.45

Ⓒ 3.12

Ⓓ 2.98

Ⓔ 2.88

Item Number: M011015

Overall Percent Correct

Singapore	94	▲
Hong Kong, SAR	84	▲
Chinese Taipei	83	▲
Russian Federation	81	▲
Latvia	79	▲
Armenia	74	▲
Italy	74	▲
Lithuania	73	▲
Japan	72	▲
Moldova, Republic of	72	▲
United States	72	▲
Belgium (Flemish)	71	▲
Netherlands	69	▲
Cyprus	65	O
Hungary	63	O
International average	**61**	
Scotland	51	▼
Tunisia	47	▼
Slovenia	44	▼
England	43	▼
Morocco	41	▼
Philippines	40	▼
Iran, Islamic Republic of	38	▼
Norway	38	▼
Australia	35	▼
New Zealand	28	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	**E**

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

Fraction to decimal

Which of these means $\dfrac{7}{10}$?

(A) 70

(B) 7

(C) 0.7

(D) 0.07

Item Number: M011020

Overall Percent Correct

Singapore	95	▲
Hong Kong, SAR	78	▲
Chinese Taipei	74	▲
Belgium (Flemish)	73	▲
Cyprus	65	▲
United States	62	▲
Japan	60	▲
Italy	58	▲
Moldova, Republic of	52	▲
Philippines	49	▲
Lithuania	48	▲
England	46	O
International average	**43**	
Australia	42	O
Armenia	42	O
Russian Federation	39	O
New Zealand	37	▼
Netherlands	29	▼
Morocco	23	▼
Scotland	22	▼
Hungary	17	▼
Norway	17	▼
Iran, Islamic Republic of	16	▼
Tunisia	15	▼
Latvia	12	▼
Slovenia	8	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

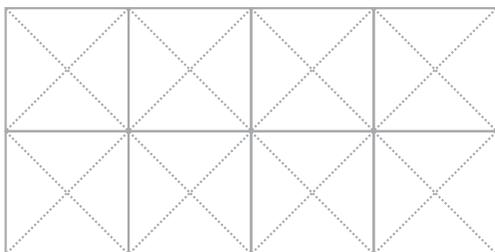| Content Domain	Main Topic	Cognitive Domain
A. NUMBER	**Fractions and Decimals**	**Knowing Facts and Procedures**
B. NUMBER	Fractions and Decimals	Reasoning

Geometry Tiles: ½ black

A. WITHOUT using any triangle tiles, place 4 tiles so that $\frac{1}{2}$ of a square shape is black. Then shade in the square below to show what you did with your tiles.

Shade in Here

B. Place 8 tiles so that $\frac{5}{8}$ of the rectangle shape is black. Then shade in the rectangle below to show what you did with your tiles.

Shade in Here

Item Number: M031348A

Overall Percent Correct

Singapore	56	▲
Belgium (Flemish)	51	▲
England	49	▲
United States	48	▲
Netherlands	46	▲
Japan	45	▲
New Zealand	44	▲
Hong Kong, SAR	43	▲
Australia	42	▲
Cyprus	39	▲
Hungary	39	O
Latvia	37	▲
Scotland	36	O
Lithuania	35	O
International average	**33**	
Chinese Taipei	32	O
Russian Federation	32	O
Norway	31	O
Italy	30	O
Moldova, Republic of	28	▼
Slovenia	24	▼
Philippines	16	▼
Armenia	11	▼
Iran, Islamic Republic of	7	▼
Morocco	4	▼
Tunisia	4	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• Draws a pattern made up of 2 black tiles and two white tiles. See examples below.

Incorrect Response

• Other incorrect (including crossed out/erased, stray marks, illegible, or off task)
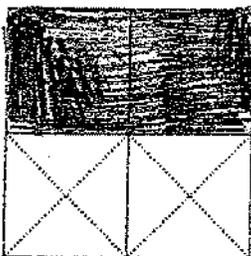
Geometry Tiles: ½ black (continued)

Item Number: M031348A

Student Responses

Correct Response:

A. WITHOUT using any triangle tiles, place 4 tiles so that $\frac{1}{2}$ of a square shape is black. Then shade in the square below to show what you did with your tiles.
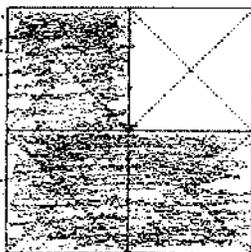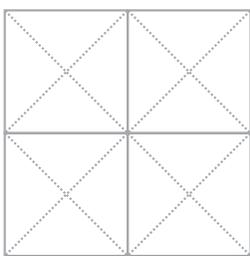
Shade in Here

Incorrect Response:

A. WITHOUT using any triangle tiles, place 4 tiles so that $\frac{1}{2}$ of a square shape is black. Then shade in the square below to show what you did with your tiles.
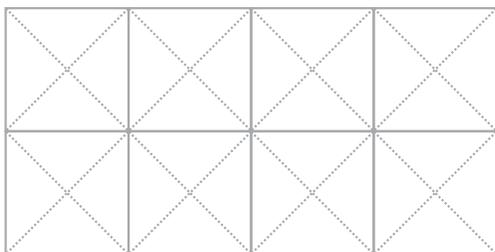
Shade in Here

Content Domain	Main Topic	Cognitive Domain
A. NUMBER	Fractions and Decimals	Knowing Facts and Procedures
B. NUMBER	**Fractions and Decimals**	**Reasoning**

Geometry Tiles: ⅝ black

A. WITHOUT using any triangle tiles, place 4 tiles so that $\frac{1}{2}$ of a square shape is black. Then shade in the square below to show what you did with your tiles.

Shade in Here

B. Place 8 tiles so that $\frac{5}{8}$ of the rectangle shape is black. Then shade in the rectangle below to show what you did with your tiles.

Shade in Here

Item Number: M031348B

Overall Percent Correct

Japan	13	▲
Latvia	13	▲
England	13	▲
Belgium (Flemish)	13	▲
Australia	11	▲
Singapore	11	▲
New Zealand	10	▲
Russian Federation	10	O
Chinese Taipei	8	O
Cyprus	8	O
Lithuania	8	O
Netherlands	8	O
United States	8	O
Hong Kong, SAR	7	O
Scotland	7	O
International average	**7**	
Italy	6	O
Norway	5	O
Hungary	4	▼
Iran, Islamic Republic of	1	▼
Moldova, Republic of	1	▼
Philippines	1	▼
Slovenia	1	▼
Tunisia	1	▼
Armenia	0	▼
Morocco	0	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response
• Any figure using 3 black, 1 white, and 4 triangle tiles:

Partially Correct Response
• ⅝ of the figure shaded without using correct tiles

Incorrect Response
• ½ of the figure shaded
• Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

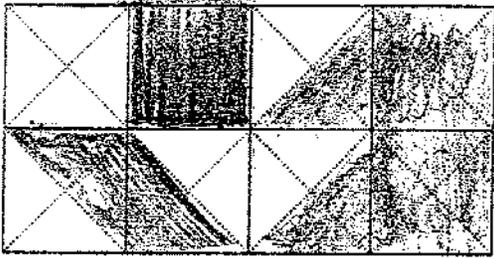Geometry Tiles: ⅝ black (continued)

Item Number: M031348B

Student Responses

Correct Response:

B. Place 8 tiles so that $\frac{5}{8}$ of the rectangle shape is black. Then shade in the rectangle below to show what you did with your tiles.

Shade in Here

Incorrect Response:

B. Place 8 tiles so that $\frac{5}{8}$ of the rectangle shape is black. Then shade in the rectangle below to show what you did with your tiles.
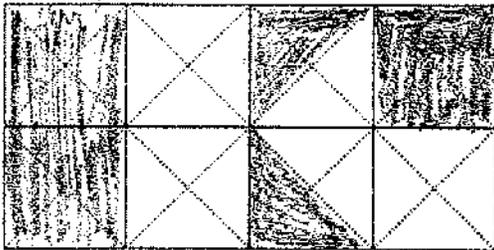
Shade in Here

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

Fraction of cake left

Janis, Maija, and their mother were eating a cake. Janis ate $\frac{1}{2}$ of the cake. Maija ate $\frac{1}{4}$ of the cake. Their mother ate $\frac{1}{4}$ of the cake.

How much of the cake is left?

(A) $\frac{3}{4}$

(B) $\frac{1}{2}$

(C) $\frac{1}{4}$

(D) None

Item Number: M012119

Overall Percent Correct

Singapore	83	▲
England	83	▲
Hong Kong, SAR	82	▲
New Zealand	74	▲
Lithuania	73	▲
Scotland	70	▲
Australia	68	▲
United States	65	▲
Belgium (Flemish)	65	▲
Netherlands	63	O
Russian Federation	63	O
Hungary	61	O
Moldova, Republic of	61	O
Italy	60	O
Latvia	60	O
International average	**59**	
Slovenia	58	O
Cyprus	54	▼
Chinese Taipei	51	▼
Norway	49	▼
Armenia	48	▼
Iran, Islamic Republic of	48	▼
Japan	47	▼
Morocco	32	▼
Philippines	32	▼
Tunisia	24	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

⅓ of 600 balls in a box

There are 600 balls in a box, and $\dfrac{1}{3}$ of the balls are red.

How many red balls are in the box?

Answer: _____ red balls

Item Number: M031065

Overall Percent Correct

Lithuania	85	▲
Singapore	84	▲
Latvia	82	▲
Belgium (Flemish)	82	▲
Russian Federation	78	▲
Moldova, Republic of	68	▲
Cyprus	64	▲
Hong Kong, SAR	64	▲
Armenia	63	▲
Netherlands	63	▲
Hungary	62	▲
Japan	56	▲
Chinese Taipei	55	▲
International average	**49**	
Italy	43	▼
England	41	▼
Scotland	40	▼
United States	38	▼
New Zealand	34	▼
Slovenia	32	▼
Australia	30	▼
Tunisia	24	▼
Norway	19	▼
Philippines	14	▼
Iran, Islamic Republic of	9	▼
Morocco	7	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• 200

Incorrect Response

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

⅓ of 600 balls in a box (continued)
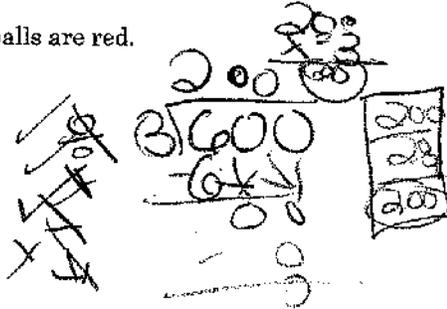
Item Number: M031065

Student Responses

Correct Response:

There are 600 balls in a box, and $\frac{1}{3}$ of the balls are red.

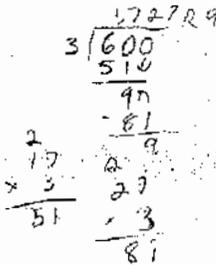How many red balls are in the box?

Answer: ___260___ red balls

Incorrect Response:

There are 600 balls in a box, and $\frac{1}{3}$ of the balls are red.

How many red balls are in the box?

Answer: ___1,72729___ red balls

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

What fraction of cake John ate

A cake was cut into 8 pieces of equal size. John ate 3 pieces of the cake. What fraction of the cake did John eat?

Ⓐ $\dfrac{1}{8}$

Ⓑ $\dfrac{3}{8}$

Ⓒ $\dfrac{3}{5}$

Ⓓ $\dfrac{8}{3}$

Overall Percent Correct

Chinese Taipei	97	▲
Hong Kong, SAR	93	▲
Singapore	89	▲
Belgium (Flemish)	89	▲
Japan	88	▲
United States	86	▲
Cyprus	85	▲
Netherlands	83	▲
England	80	▲
Australia	79	▲
New Zealand	77	▲
Lithuania	73	▲
Italy	72	O
Scotland	71	O
Latvia	69	O
International average	**69**	
Hungary	64	▼
Norway	62	▼
Iran, Islamic Republic of	58	▼
Russian Federation	58	▼
Armenia	53	▼
Philippines	52	▼
Moldova, Republic of	46	▼
Slovenia	42	▼
Tunisia	28	▼
Morocco	27	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031216

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

Which figure has one-half black dots

In which figure are one-half of the dots black?

Overall Percent Correct

Belgium (Flemish)	97	▲
Netherlands	97	▲
Hungary	95	▲
Moldova, Republic of	91	▲
Russian Federation	90	▲
Hong Kong, SAR	90	▲
Lithuania	89	▲
Singapore	89	▲
Japan	88	▲
Italy	88	▲
Armenia	86	▲
Norway	85	▲
Australia	85	▲
Latvia	84	▲
England	84	▲
New Zealand	84	▲
United States	79	▲
Scotland	76	O
International average	**75**	
Iran, Islamic Republic of	66	▼
Cyprus	56	▼
Morocco	47	▼
Tunisia	46	▼
Chinese Taipei	42	▼
Philippines	37	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M011001

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

3 of 4 squares shaded

In this diagram, 2 out of every 3 squares are shaded.
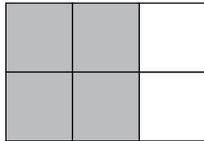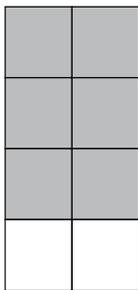
Which diagram has 3 out of every 4 squares shaded?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

Item Number: M011016

Overall Percent Correct

Singapore	77	▲
Belgium (Flemish)	74	▲
Japan	73	▲
Lithuania	71	▲
Hong Kong, SAR	70	▲
Italy	68	▲
Netherlands	65	▲
United States	63	▲
England	63	▲
Cyprus	60	▲
Moldova, Republic of	60	▲
Chinese Taipei	59	▲
Slovenia	56	O
International average	**55**	
Scotland	54	O
Australia	51	O
New Zealand	51	O
Norway	46	▼
Russian Federation	46	▼
Hungary	45	▼
Latvia	45	▼
Armenia	43	▼
Iran, Islamic Republic of	43	▼
Philippines	33	▼
Morocco	25	▼
Tunisia	22	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

Figure showing fraction of shaded square

Overall Percent Correct

Which shows $\frac{2}{3}$ of the square shaded?

(A)   (B)   (C)   (D)   (E)
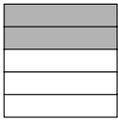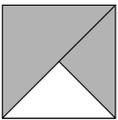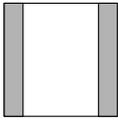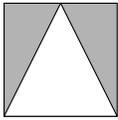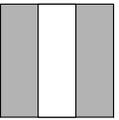
Singapore	93	▲
Hong Kong, SAR	86	▲
United States	82	▲
Chinese Taipei	81	▲
Belgium (Flemish)	79	▲
Japan	76	▲
Cyprus	75	▲
Netherlands	73	▲
England	67	▲
Australia	62	▲
Latvia	60	O
New Zealand	59	O
International average	**57**	
Hungary	56	O
Lithuania	56	O
Italy	55	O
Scotland	52	▼
Philippines	50	▼
Russian Federation	49	▼
Iran, Islamic Republic of	47	▼
Moldova, Republic of	43	▼
Slovenia	34	▼
Armenia	29	▼
Norway	29	▼
Morocco	13	▼
Tunisia	12	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M012044

Correct Response:	E

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

Maria collected soft drink bottles

For every soft drink bottle that Fred collected, Maria collected 3. Fred collected a total of 9 soft drink bottles. How many did Maria collect?

Ⓐ   3

Ⓑ   12

Ⓒ   13

Ⓓ   27

Item Number: M031108

Overall Percent Correct

Chinese Taipei	74	▲
Hong Kong, SAR	74	▲
Lithuania	67	▲
Singapore	67	▲
Japan	65	▲
Netherlands	63	▲
England	60	▲
Belgium (Flemish)	59	▲
Cyprus	58	▲
United States	55	▲
Hungary	52	O
Russian Federation	52	O
International average	**49**	
Scotland	47	O
Armenia	46	O
Slovenia	46	O
Moldova, Republic of	43	O
Australia	42	▼
Italy	40	▼
New Zealand	40	▼
Norway	40	▼
Latvia	38	▼
Iran, Islamic Republic of	28	▼
Tunisia	21	▼
Morocco	20	▼
Philippines	20	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	**D**

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

Number rounded to 600

Which number would be rounded to 600 when rounded to the nearest hundred?

(A) 62

(B) 160

(C) 546

(D) 586

(E) 660

Item Number: M011019

Overall Percent Correct

Singapore	87	▲
Chinese Taipei	86	▲
Netherlands	86	▲
Japan	85	▲
England	84	▲
Hungary	83	▲
Hong Kong, SAR	82	▲
United States	80	▲
Australia	78	▲
Scotland	78	▲
Belgium (Flemish)	78	▲
Moldova, Republic of	70	▲
New Zealand	70	▲
Cyprus	68	▲
International average	**64**	
Lithuania	61	O
Norway	59	O
Italy	53	▼
Morocco	52	▼
Latvia	50	▼
Armenia	46	▼
Russian Federation	45	▼
Slovenia	39	▼
Tunisia	38	▼
Philippines	20	▼
Iran, Islamic Republic of	11	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response: D

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

Which number is it

What number equals 3 ones + 5 tens + 4 hundreds + 60 thousands?

Ⓐ   6,453

Ⓑ   60,453

Ⓒ   64,530

Ⓓ   354,060

Ⓔ   604,530

Item Number: M011021

Overall Percent Correct

Country		
Singapore	88	▲
Netherlands	85	▲
Japan	84	▲
Chinese Taipei	83	▲
Hungary	83	▲
Latvia	80	▲
Russian Federation	80	▲
United States	80	▲
Belgium (Flemish)	80	▲
Italy	72	▲
Cyprus	70	O
Lithuania	69	O
England	68	O
International average	**68**	
Iran, Islamic Republic of	63	O
Australia	62	▼
New Zealand	62	▼
Hong Kong, SAR	61	▼
Slovenia	61	▼
Norway	60	▼
Moldova, Republic of	59	▼
Morocco	53	▼
Scotland	52	▼
Tunisia	51	▼
Philippines	45	▼
Armenia	42	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

Express number in words

Which of these is a name for 9,740?

(A) Nine thousand seventy-four

(B) Nine thousand seven hundred forty

(C) Nine thousand seventy-four hundred

(D) Nine hundred seventy-four thousand

Item Number: M011024

Overall Percent Correct

Chinese Taipei	98	▲
Hong Kong, SAR	98	▲
Singapore	97	▲
Japan	96	▲
England	95	▲
Belgium (Flemish)	95	▲
Netherlands	92	▲
Italy	91	▲
Lithuania	91	▲
United States	91	▲
Latvia	90	▲
Russian Federation	90	▲
Australia	89	O
Hungary	88	O
Moldova, Republic of	87	O
New Zealand	87	O
Scotland	87	O
International average	**86**	
Cyprus	85	O
Slovenia	81	▼
Norway	80	▼
Armenia	79	▼
Philippines	79	▼
Iran, Islamic Republic of	72	▼
Morocco	64	▼
Tunisia	50	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

Which number is equal

Which number is equal to eight tens plus nine tens?

- (A)   17
- (B)   170
- (C)   1,700
- (D)   17,000

Overall Percent Correct

Chinese Taipei	91	▲
Singapore	87	▲
Hungary	85	▲
Moldova, Republic of	84	▲
Hong Kong, SAR	80	▲
Netherlands	77	▲
Latvia	75	▲
Lithuania	73	▲
New Zealand	73	▲
England	73	▲
Armenia	72	▲
Russian Federation	72	▲
Belgium (Flemish)	70	▲
Japan	69	▲
Australia	67	O
Norway	65	O
United States	65	O
International average	**65**	
Scotland	64	O
Cyprus	54	▼
Slovenia	53	▼
Italy	51	▼
Iran, Islamic Republic of	34	▼
Morocco	29	▼
Philippines	28	▼
Tunisia	27	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M011028

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

15 times 9

$15 \times 9 =$

Answer: _____

Overall Percent Correct

Chinese Taipei	94	▲
Singapore	93	▲
Hong Kong, SAR	91	▲
Russian Federation	90	▲
Moldova, Republic of	88	▲
Lithuania	87	▲
Japan	86	▲
Latvia	86	▲
Netherlands	86	▲
Armenia	85	▲
Hungary	85	▲
Belgium (Flemish)	84	▲
Cyprus	76	▲
Italy	75	O
United States	73	O
International average	**72**	
Tunisia	68	O
Slovenia	67	O
Iran, Islamic Republic of	61	▼
Philippines	59	▼
England	59	▼
Scotland	54	▼
Australia	45	▼
New Zealand	41	▼
Morocco	36	▼
Norway	30	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031305

SCORING

Correct Response

- 135

Incorrect Response

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

15 times 9 (continued)

Item Number: M031305

Student Responses

Correct Response:

$$\overset{4}{15} \times 9 =$$

$$\begin{array}{r} 4 \\ \hline 135 \end{array}$$

Answer: ___135___

Incorrect Response:

$$15 \times 9 =$$

Answer: ___55___

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

204 divided by 4

$204 \div 4 =$

Answer: _____

Overall Percent Correct

Hong Kong, SAR	93	▲
Singapore	91	▲
Chinese Taipei	90	▲
Russian Federation	90	▲
Hungary	86	▲
Moldova, Republic of	85	▲
Japan	84	▲
Latvia	82	▲
Lithuania	82	▲
Belgium (Flemish)	77	▲
Cyprus	72	▲
Italy	71	▲
Armenia	70	▲
Netherlands	65	O
International average	**63**	
United States	55	▼
Tunisia	47	▼
Iran, Islamic Republic of	46	▼
England	46	▼
Scotland	42	▼
Slovenia	41	▼
Philippines	38	▼
Australia	33	▼
New Zealand	33	▼
Norway	27	▼
Morocco	17	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031306

SCORING

Correct Response

- 51

Incorrect Response

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

204 divided by 4 (continued)

Item Number: M031306

Student Responses

Correct Response:

$204 \div 4 =$

Answer: 5|

Incorrect Response:

$204 \div 4 =$

Answer: 150 R4

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Reasoning

The number Lia should add to 142 to get 369

Lia is practicing addition and subtraction problems. What number should Lia add to 142 to get 369?

Answer: _____

Item Number: M031130

Overall Percent Correct

Singapore	88	▲
Hungary	86	▲
Russian Federation	85	▲
Chinese Taipei	83	▲
Lithuania	83	▲
Hong Kong, SAR	82	▲
Japan	81	▲
Latvia	79	▲
Belgium (Flemish)	72	▲
United States	71	▲
Netherlands	69	▲
Armenia	64	O
Cyprus	64	O
Moldova, Republic of	64	O
International average	**62**	
England	59	O
Italy	57	O
Slovenia	54	▼
Australia	52	▼
Scotland	51	▼
New Zealand	46	▼
Iran, Islamic Republic of	39	▼
Norway	37	▼
Tunisia	29	▼
Philippines	28	▼
Morocco	24	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

- 227

Incorrect Response

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

The number Lia should add to 142 to get 369 (continued)

Item Number: M031130

Student Responses

Correct Response:

Lia is practicing addition and subtraction problems. What number should Lia add to 142 to get 369?

Answer: 227

$$
\begin{array}{r}
369 \\
-142 \\
\hline 227
\end{array}
$$

Incorrect Response:

Lia is practicing addition and subtraction problems. What number should Lia add to 142 to get 369?

Answer: 225

$$
\begin{array}{r}
369 \\
-142 \\
\hline 225
\end{array}
$$

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Reasoning

1279 plus 243 by mistake

Juanita wanted to use her calculator to add 1,379 and 243. She entered 1,279+ 243 by mistake. Which of these could she do to correct the mistake?

(A) Add 100

(B) Add 1

(C) Subtract 1

(D) Subtract 100

Item Number: M031341

Overall Percent Correct

Hungary	89	▲
Netherlands	88	▲
Belgium (Flemish)	88	▲
Chinese Taipei	85	▲
Hong Kong, SAR	84	▲
Japan	83	▲
Russian Federation	83	▲
Singapore	83	▲
England	82	▲
Latvia	79	▲
Lithuania	77	▲
Slovenia	77	O
Australia	76	▲
United States	75	▲
Scotland	74	O
Cyprus	73	O
International average	**72**	
Italy	70	O
Norway	70	O
Moldova, Republic of	68	O
New Zealand	68	▼
Armenia	64	▼
Philippines	47	▼
Iran, Islamic Republic of	45	▼
Tunisia	39	▼
Morocco	38	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	A

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Total number of boys and girls

In Toshi's class there are twice as many girls as boys. There are 8 boys in the class. What is the total number of boys and girls in the class?

Ⓐ 12

Ⓑ 16

Ⓒ 20

Ⓓ 24

Item Number: M011002

Overall Percent Correct

Netherlands	82	▲
Singapore	81	▲
New Zealand	64	▲
Hungary	62	▲
Japan	62	▲
Belgium (Flemish)	62	▲
Australia	60	▲
Lithuania	60	▲
England	60	▲
Cyprus	56	▲
United States	54	▲
Latvia	53	O
Russian Federation	53	O
Italy	51	O
International average	**51**	
Hong Kong, SAR	50	O
Slovenia	50	O
Norway	49	O
Scotland	48	O
Moldova, Republic of	47	O
Armenia	40	▼
Chinese Taipei	29	▼
Morocco	24	▼
Tunisia	24	▼
Philippines	22	▼
Iran, Islamic Republic of	20	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Total number of pencils

There are 9 boxes of pencils. Each box has 125 pencils. What is the total number of pencils?

Ⓐ 1,025

Ⓑ 1,100

Ⓒ 1,125

Ⓓ 1,220

Ⓔ 1,225

Item Number: M011003

Overall Percent Correct

Singapore	91	▲
Chinese Taipei	83	▲
Russian Federation	79	▲
Hong Kong, SAR	77	▲
Cyprus	76	▲
United States	76	▲
Japan	74	▲
Hungary	73	▲
Lithuania	73	▲
Latvia	72	▲
Italy	70	▲
Moldova, Republic of	69	▲
Armenia	66	O
Netherlands	64	O
Belgium (Flemish)	63	O
International average	**63**	
England	55	▼
Scotland	51	▼
Slovenia	50	▼
Iran, Islamic Republic of	49	▼
Philippines	49	▼
Australia	48	▼
New Zealand	47	▼
Tunisia	45	▼
Morocco	37	▼
Norway	34	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

How long to wash windows

It takes Chris 4 minutes to wash a window. He wants to know how many minutes it will take him to wash 8 windows at this rate. He should

- Ⓐ multiply 4×8
- Ⓑ divide 8 by 4
- Ⓒ subtract 4 from 8
- Ⓓ add 8 and 4

Item Number: M011011

Overall Percent Correct

Chinese Taipei	94	▲
Singapore	93	▲
Netherlands	92	▲
Hong Kong, SAR	91	▲
Japan	91	▲
Belgium (Flemish)	89	▲
Lithuania	88	▲
United States	88	▲
England	88	▲
Cyprus	85	▲
Hungary	84	▲
Latvia	83	▲
Russian Federation	83	▲
Australia	81	▲
Italy	79	O
Scotland	79	O
Moldova, Republic of	77	O
International average	**77**	
Armenia	73	▼
New Zealand	73	▼
Slovenia	69	▼
Norway	68	▼
Philippines	56	▼
Iran, Islamic Republic of	51	▼
Morocco	40	▼
Tunisia	40	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	A

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Estimate number of cabbages

Mark's garden has 84 rows of cabbages. There are 57 cabbages in each row. Which of these gives the BEST way to estimate how many cabbages there are altogether?

Ⓐ $100 \times 50 = 5,000$

Ⓑ $90 \times 60 = 5,400$

Ⓒ $80 \times 60 = 4,800$

Ⓓ $80 \times 50 = 4,000$

Item Number: M012117

Overall Percent Correct

Singapore	84	▲
Hong Kong, SAR	71	▲
United States	70	▲
Netherlands	68	▲
Belgium (Flemish)	68	▲
Hungary	66	▲
Moldova, Republic of	62	▲
Chinese Taipei	61	▲
Japan	59	▲
Cyprus	55	▲
England	51	O
International average	**50**	
Australia	48	O
Lithuania	46	▼
Armenia	45	▼
Russian Federation	45	O
Slovenia	45	▼
Scotland	42	▼
Latvia	40	▼
New Zealand	36	▼
Philippines	35	▼
Italy	34	▼
Norway	32	▼
Tunisia	31	▼
Iran, Islamic Republic of	30	▼
Morocco	26	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Notebooks for 115 students

Each student needs 8 notebooks for school. How many notebooks are needed for 115 students?

Answer: _____

Item Number: M031011

Overall Percent Correct

Singapore	86	▲
Chinese Taipei	85	▲
Hong Kong, SAR	80	▲
Russian Federation	76	▲
Latvia	72	▲
Hungary	69	▲
Cyprus	68	▲
Lithuania	67	▲
Japan	65	▲
Moldova, Republic of	65	▲
Belgium (Flemish)	63	▲
Armenia	58	▲
Netherlands	55	O
Italy	54	O
International average	**52**	
United States	51	O
Slovenia	44	▼
Iran, Islamic Republic of	38	▼
Tunisia	35	▼
England	30	▼
Australia	27	▼
New Zealand	27	▼
Philippines	26	▼
Scotland	24	▼
Morocco	17	▼
Norway	12	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• 920

Incorrect Response

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

Notebooks for 115 students (continued)

Item Number: M031011

Student Responses

Correct Response:

Each student needs 8 notebooks for school. How many notebooks are needed for 115 students?

Answer: 920

Incorrect Response:

Each student needs 8 notebooks for school. How many notebooks are needed for 115 students?

Answer: 2070 notebooks

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

A 204 cm rope cut into 4/calculation

A piece of rope 204 cm long is cut into 4 equal pieces. Which of these gives the length of each piece in centimeters?

Ⓐ $204 + 4$

Ⓑ 204×4

Ⓒ $204 - 4$

Ⓓ $204 \div 4$

Item Number: M031310

Overall Percent Correct

Hong Kong, SAR	94	▲
Singapore	94	▲
Chinese Taipei	90	▲
Latvia	90	▲
Belgium (Flemish)	90	▲
Lithuania	88	▲
Netherlands	88	▲
Japan	87	▲
Hungary	85	▲
Russian Federation	84	▲
Armenia	77	▲
England	76	▲
International average	**73**	
Italy	71	O
Moldova, Republic of	70	O
United States	70	O
Slovenia	69	O
Australia	66	▼
Scotland	65	▼
Cyprus	64	▼
Norway	64	▼
New Zealand	61	▼
Iran, Islamic Republic of	55	▼
Tunisia	46	▼
Morocco	40	▼
Philippines	29	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	D

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Number tiles: largest number (+)

Using the number tiles, Joan and Herbert played a new game.
They placed the numbers to make the largest answer.

A. Use the tiles ⬚1, ⬚5, and ⬚9. Write the numbers on the tiles in the boxes below to make the largest answer when you add.

B. Use the tiles ⬚2, ⬚3, and ⬚7. Write the numbers on the tiles in the boxes below to make the largest answer when you subtract.

C. Use the tiles ⬚1, ⬚4, and ⬚5. Write the numbers on the tiles in the boxes below to make the largest answer when you multiply.

Overall Percent Correct

Japan	74	▲
Singapore	71	▲
Hong Kong, SAR	69	▲
England	68	▲
Hungary	65	▲
Netherlands	65	▲
Chinese Taipei	64	▲
Cyprus	63	▲
Latvia	60	▲
Lithuania	60	▲
Scotland	60	▲
Belgium (Flemish)	57	O
United States	56	O
Australia	56	O
Iran, Islamic Republic of	54	O
New Zealand	53	O
International average	**52**	
Russian Federation	50	O
Norway	47	O
Italy	46	▼
Slovenia	45	▼
Morocco	35	▼
Moldova, Republic of	33	▼
Armenia	24	▼
Tunisia	23	▼
Philippines	11	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031345A

94

Number tiles: largest number (+) (continued)

Item Number: M031345A

SCORING

Correct Response

- 91 + 5 or 95 + 1

Incorrect Response

- Any other arrangement of digits 1, 5, and 9

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

Number tiles: largest number (+) (continued)
Item Number: M031345A

Student Responses

Correct Response:

Using the number tiles, Joan and Herbert played a new game.
They placed the numbers to make the largest answer.

A.- Use the tiles 1, 5, and 9. Write the numbers on the tiles in the
boxes below to make the largest answer when you add.

Incorrect Response:

Using the number tiles, Joan and Herbert played a new game.
They placed the numbers to make the largest answer.

A. Use the tiles 1, 5, and 9. Write the numbers on the tiles in the
boxes below to make the largest answer when you add.

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Number tiles: largest number (-)

Using the number tiles, Joan and Herbert played a new game.
They placed the numbers to make the largest answer.

A. Use the tiles 1 , 5 , and 9 . Write the numbers on the tiles in the boxes below to make the largest answer when you add.

B. Use the tiles 2 , 3 , and 7 . Write the numbers on the tiles in the boxes below to make the largest answer when you subtract.

C. Use the tiles 1 , 4 , and 5 . Write the numbers on the tiles in the boxes below to make the largest answer when you multiply.

Overall Percent Correct

Japan	73	▲
Singapore	69	▲
Hong Kong, SAR	67	▲
Hungary	64	▲
Netherlands	64	▲
Chinese Taipei	63	▲
Latvia	60	▲
England	59	▲
Lithuania	57	▲
Belgium (Flemish)	56	▲
Cyprus	55	▲
United States	53	O
Russian Federation	52	O
Australia	52	O
Scotland	52	O
New Zealand	51	O
International average	**50**	
Iran, Islamic Republic of	49	O
Norway	47	O
Italy	46	O
Slovenia	41	▼
Moldova, Republic of	39	▼
Armenia	23	▼
Morocco	21	▼
Tunisia	19	▼
Philippines	9	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031345B

Number tiles: largest number (-) (continued)

Item Number: M031345B

SCORING

Correct Response

• 73 - 2

Incorrect Response

• 72 - 3

• Any other arrangement of the digits 2, 3, and 7

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

Number tiles: largest number (-) (continued)

Item Number: M031345B

Student Responses

Correct Response:

B. Use the tiles ☐2, ☐3, and ☐7. Write the numbers on the tiles in the boxes below to make the largest answer when you subtract.

Incorrect Response:

B. Use the tiles ☐2, ☐3, and ☐7. Write the numbers on the tiles in the boxes below to make the largest answer when you subtract.

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

Number tiles: largest number (X)

Using the number tiles, Joan and Herbert played a new game.
They placed the numbers to make the largest answer.

A. Use the tiles 1, 5, and 9. Write the numbers on the tiles in the boxes below to make the largest answer when you add.

B. Use the tiles 2, 3, and 7. Write the numbers on the tiles in the boxes below to make the largest answer when you subtract.

C. Use the tiles 1, 4, and 5. Write the numbers on the tiles in the boxes below to make the largest answer when you multiply.

Overall Percent Correct

Japan	35	▲
Singapore	26	▲
Hong Kong, SAR	24	▲
Cyprus	23	▲
Chinese Taipei	22	▲
Hungary	22	▲
England	19	O
Tunisia	18	O
Belgium (Flemish)	18	O
Latvia	17	O
Morocco	17	O
Australia	16	O
Lithuania	16	O
International average	**16**	
Italy	15	O
Scotland	15	O
Netherlands	14	O
Norway	14	O
United States	14	▼
Moldova, Republic of	13	O
New Zealand	13	O
Iran, Islamic Republic of	12	▼
Russian Federation	12	▼
Armenia	7	▼
Slovenia	5	▼
Philippines	3	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Item Number: M031345C

Number tiles: largest number (X) (continued)

Item Number: M031345C

SCORING

Correct Response

- 41 x 5

Incorrect Response

- 51 x 4

- Any other arrangement of the digits 1, 4, and 5

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

Number tiles: largest number (X) (continued)

Item Number: M031345C

Student Responses

Correct Response:

C. Use the tiles ☐1☐, ☐4☐, and ☐5☐. Write the numbers on the tiles in the boxes below to make the largest answer when you multiply.

Incorrect Response:

C. Use the tiles ☐1☐, ☐4☐, and ☐5☐. Write the numbers on the tiles in the boxes below to make the largest answer when you multiply.

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Number represented by squares

Each small square (□) is equal to 1. There are 10 small squares in each strip. There are 100 small squares in each large square.

What number is shown?

Ⓐ 16

Ⓑ 358

Ⓒ 538

Ⓓ 835

Item Number: M011004

Overall Percent Correct

Chinese Taipei	98	▲
Belgium (Flemish)	92	▲
Japan	89	▲
Singapore	89	▲
United States	89	▲
Australia	86	▲
Netherlands	86	▲
Hong Kong, SAR	85	▲
England	84	▲
New Zealand	82	▲
Lithuania	80	▲
Scotland	80	▲
Latvia	79	▲
Cyprus	78	O
Moldova, Republic of	78	O
Italy	77	O
Norway	76	O
Slovenia	75	O
International average	**75**	
Russian Federation	74	O
Hungary	68	▼
Philippines	57	▼
Iran, Islamic Republic of	56	▼
Armenia	39	▼
Morocco	38	▼
Tunisia	34	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	**B**

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Which has same value

Which of these has the same value as 342?

- Ⓐ 3,000 + 400 + 2
- Ⓑ 300 + 40 + 2
- Ⓒ 30 + 4 + 2
- Ⓓ 3 + 4 + 2

Item Number: M011007

Overall Percent Correct

Chinese Taipei	98	▲
Belgium (Flemish)	98	▲
Hong Kong, SAR	97	▲
Japan	97	▲
Latvia	97	▲
Netherlands	97	▲
Singapore	97	▲
Hungary	96	▲
Russian Federation	96	▲
Lithuania	94	▲
United States	92	▲
England	91	▲
Cyprus	89	O
Italy	89	O
Moldova, Republic of	89	O
Slovenia	89	O
Norway	88	O
Australia	87	O
Armenia	87	O
International average	**87**	
New Zealand	82	▼
Scotland	79	▼
Morocco	64	▼
Tunisia	64	▼
Philippines	62	▼
Iran, Islamic Republic of	56	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Digit in hundreds place

Which digit is in the hundreds place in 2,345?

Ⓐ 2

Ⓑ 3

Ⓒ 4

Ⓓ 5

Item Number: M011018

Overall Percent Correct

Chinese Taipei	96	▲
Singapore	95	▲
Japan	94	▲
United States	92	▲
Netherlands	91	▲
Belgium (Flemish)	90	▲
England	87	▲
Australia	83	▲
Hungary	80	O
Lithuania	80	O
Moldova, Republic of	80	O
Latvia	79	O
Scotland	79	O
Cyprus	78	O
Italy	77	O
International average	**77**	
Russian Federation	75	O
Iran, Islamic Republic of	73	O
New Zealand	73	▼
Hong Kong, SAR	70	▼
Norway	69	▼
Armenia	59	▼
Philippines	59	▼
Morocco	57	▼
Slovenia	54	▼
Tunisia	44	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

Correct Response:	B

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Which is true

Which number sentence is true?

Ⓐ $968 < 698$

Ⓑ $968 < 689$

Ⓒ $968 > 689$

Ⓓ $968 = 689$

Item Number: M011026

Overall Percent Correct

Chinese Taipei	90	▲
Singapore	84	▲
Russian Federation	82	▲
Belgium (Flemish)	81	▲
Hong Kong, SAR	80	▲
Hungary	80	▲
United States	80	▲
Japan	79	▲
Moldova, Republic of	78	▲
Slovenia	78	▲
Latvia	76	▲
Lithuania	76	▲
Italy	75	▲
Armenia	71	▲
Cyprus	68	O
International average	**66**	
Norway	65	O
New Zealand	62	▼
England	59	▼
Philippines	54	▼
Netherlands	53	▼
Iran, Islamic Republic of	47	▼
Australia	45	▼
Morocco	42	▼
Tunisia	28	▼
Scotland	28	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Correct Response:	C

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Number going in the number line box
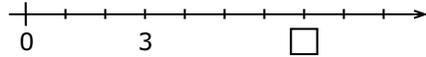
On the number line above, what number goes in the box?

Number in □ = _____

Item Number: M031162

Overall Percent Correct

Japan	88	▲
Belgium (Flemish)	88	▲
Singapore	87	▲
Hungary	86	▲
Chinese Taipei	85	▲
Netherlands	85	▲
England	80	▲
Latvia	76	▲
Italy	74	▲
Hong Kong, SAR	72	▲
Lithuania	72	▲
Slovenia	71	▲
New Zealand	66	O
United States	66	O
International average	**66**	
Australia	64	O
Cyprus	60	▼
Russian Federation	60	▼
Scotland	60	▼
Moldova, Republic of	56	▼
Iran, Islamic Republic of	55	▼
Norway	54	▼
Armenia	45	▼
Philippines	36	▼
Morocco	30	▼
Tunisia	28	▼

Country average vs. International average:

Higher	▲
Not different	O
Lower	▼

SCORING

Correct Response

• 7

Incorrect Response

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

Number going in the number line box (continued)

Item Number: M031162

Student Responses
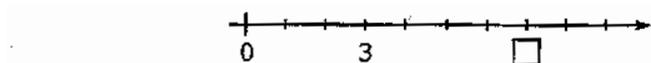
Correct Response:

On the number line above, what number goes in the box?

Number in □ = ____9____

Incorrect Response:
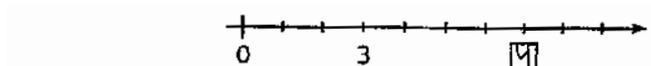
On the number line above, what number goes in the box?

Number in □ = ____4____

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Number tiles: get to 20 using 2,7,9

Overall Percent Correct

Chinese Taipei	69	▲
Japan	65	▲
Hong Kong, SAR	61	▲
Hungary	53	▲
Italy	53	▲
Lithuania	51	▲
Cyprus	50	▲
Singapore	49	▲
Russian Federation	47	O
Belgium (Flemish)	47	▲
Latvia	45	O
Moldova, Republic of	44	O
United States	43	O
New Zealand	41	O
International average	**41**	
Netherlands	40	O
Slovenia	40	O
England	40	O
Australia	38	O
Norway	36	O
Scotland	36	O
Tunisia	24	▼
Iran, Islamic Republic of	22	▼
Philippines	13	▼
Morocco	9	▼
Armenia	5	▼

Get to 20 Number Game

Two children, Joan and Herbert, are learning to play a game
"Get to 20." Here are the rules for the game.

> **GET TO 20**
> RULES
>
> **Pick Tiles:** Each player draws three number tiles.
>
> **Add Tiles:** Each player places the three tiles to make an addition problem
> with the sum total closest to 20.
>
> For example, here are four ways a player who draws $\boxed{1}$, $\boxed{4}$, and $\boxed{5}$ could
> place the tiles:
>
> $$\begin{array}{c}\boxed{5}\boxed{1}\\ +\boxed{4}\\ \hline 55\end{array} \quad \textbf{or} \quad \begin{array}{c}\boxed{4}\boxed{5}\\ +\boxed{1}\\ \hline 46\end{array} \quad \textbf{or} \quad \begin{array}{c}\boxed{1}\boxed{5}\\ +\boxed{4}\\ \hline 19\end{array} \quad \textbf{or} \quad \begin{array}{c}\boxed{1}\\ +\boxed{5}\\ \boxed{4}\\ \hline 10\end{array}$$
>
> This player should choose to show the addition problem $\begin{array}{c}15\\ +4\\ \hline 19\end{array}$ because 19 is
> the total closest to 20.

Joan and Herbert played the game "Get to 20."

Joan picked $\boxed{2}$, $\boxed{7}$, and $\boxed{9}$. Herbert picked $\boxed{1}$, $\boxed{3}$, and $\boxed{6}$.

A. What is the addition problem that Joan could make with her number
   tiles that gives a total closest to 20? Be sure to include the total.

B. What is the addition problem that Herbert could make with his number
   tiles that gives a total closest to 20? Be sure to include the total.

C. Herbert said, "If I pick $\boxed{1}$, $\boxed{4}$, and $\boxed{6}$, I can make 20 two different
   ways."

   Show two ways Herbert could make 20 with $\boxed{1}$, $\boxed{4}$, and $\boxed{6}$.

   First way:

   Second way:

**Country average vs.
International average:**

Higher	▲
Not different	O
Lower	▼

Number tiles: get to 20 using 2,7,9 (continued)

Item Number: M031344A

SCORING

Correct Response

- 2 + 7 + 9 = 18

- 18 without addition statement shown

Incorrect Response

- 2 + 7 + 9 but 18 not shown

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

Number tiles: get to 20 using 2,7,9 (continued)

Item Number: M031344A

Student Responses

Correct Response:

Joan and Herbert played the game "Get to 20."

Joan picked 2, 7, and 9. Herbert picked 1, 3, and 6.

A. What is the addition problem that Joan could make with her number tiles that gives a total closest to 20? Be sure to include the total.

Incorrect Response:

Joan and Herbert played the game "Get to 20."

Joan picked 2, 7, and 9. Herbert picked 1, 3, and 6.

A. What is the addition problem that Joan could make with her number tiles that gives a total closest to 20? Be sure to include the total.

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Number tiles: get to 20 using 1,3,6

Get to 20 Number Game

Two children, Joan and Herbert, are learning to play a game "Get to 20." Here are the rules for the game.

GET TO 20
RULES

Pick Tiles: Each player draws three number tiles.

Add Tiles: Each player places the three tiles to make an addition problem with the sum total closest to 20.

For example, here are four ways a player who draws 1 , 4 , and 5 could place the tiles:

$$\begin{array}{r} 5\ 1 \\ +\ 4 \\ \hline 55 \end{array} \quad \text{or} \quad \begin{array}{r} 4\ 5 \\ +\ 1 \\ \hline 46 \end{array} \quad \text{or} \quad \begin{array}{r} 1\ 5 \\ +\ 4 \\ \hline 19 \end{array} \quad \text{or} \quad \begin{array}{r} 1 \\ +\ 5 \\ 4 \\ \hline 10 \end{array}$$

This player should choose to show the addition problem $\begin{array}{r} 15 \\ +4 \\ \hline 19 \end{array}$ because 19 is the total closest to 20.

Joan and Herbert played the game "Get to 20."

Joan picked 2 , 7 , and 9 . Herbert picked 1 , 3 , and 6 .

A. What is the addition problem that Joan could make with her number tiles that gives a total closest to 20? Be sure to include the total.

B. What is the addition problem that Herbert could make with his number tiles that gives a total closest to 20? Be sure to include the total.

C. Herbert said, "If I pick 1 , 4 , and 6 , I can make 20 two different ways."

Show two ways Herbert could make 20 with 1 , 4 , and 6 .

First way:

Second way:

Overall Percent Correct

Chinese Taipei	65	▲
Hungary	64	▲
Japan	61	▲
Singapore	57	▲
Belgium (Flemish)	57	▲
Latvia	55	▲
Hong Kong, SAR	51	▲
Lithuania	51	▲
England	50	▲
Cyprus	49	▲
Italy	49	▲
United States	48	▲
Russian Federation	46	O
Netherlands	43	O
New Zealand	43	O
Slovenia	41	O
International average	**41**	
Australia	39	O
Scotland	37	O
Moldova, Republic of	36	O
Norway	35	▼
Iran, Islamic Republic of	13	▼
Philippines	13	▼
Armenia	6	▼
Tunisia	6	▼
Morocco	4	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Number tiles: get to 20 using 1,3,6 (continued)

Item Number: M031344B

SCORING

Correct Response

- 13 + 6 = 19 OR 16 + 3 = 19
- 19 without addition statement shown

Incorrect Response

- 13 + 6 OR 16 + 3 but 19 not shown
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Number tiles: get to 20 using 1,3,6 (continued)

Item Number: M031344B

Student Responses

Correct Response:

B. What is the addition problem that Herbert could make with his number tiles that gives a total closest to 20? Be sure to include the total.

Herbert will get 19

Incorrect Response:

B. What is the addition problem that Herbert could make with his number tiles that gives a total closest to 20? Be sure to include the total.

all or them

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Using Concepts

Number tiles: get to 20 using 1,4,6

Get to 20 Number Game

Two children, Joan and Herbert, are learning to play a game
"Get to 20." Here are the rules for the game.

GET TO 20
RULES

Pick Tiles: Each player draws three number tiles.

Add Tiles: Each player places the three tiles to make an addition problem
with the sum total closest to 20.

For example, here are four ways a player who draws $\boxed{1}$, $\boxed{4}$, and $\boxed{5}$ could
place the tiles:

$$\begin{array}{c}\boxed{5}\;\boxed{1}\\ +\;\boxed{4}\\ \hline 55\end{array} \quad \textbf{or} \quad \begin{array}{c}\boxed{4}\;\boxed{5}\\ +\;\boxed{1}\\ \hline 46\end{array} \quad \textbf{or} \quad \begin{array}{c}\boxed{1}\;\boxed{5}\\ +\;\boxed{4}\\ \hline 19\end{array} \quad \textbf{or} \quad \begin{array}{c}\boxed{1}\\ +\;\boxed{5}\\ \boxed{4}\\ \hline 10\end{array}$$

This player should choose to show the addition problem $\begin{array}{c}15\\+4\\ \hline 19\end{array}$ because 19 is
the total closest to 20.

Joan and Herbert played the game "Get to 20."

Joan picked $\boxed{2}$, $\boxed{7}$, and $\boxed{9}$. Herbert picked $\boxed{1}$, $\boxed{3}$, and $\boxed{6}$.

A. What is the addition problem that Joan could make with her number
tiles that gives a total closest to 20? Be sure to include the total.

B. What is the addition problem that Herbert could make with his number
tiles that gives a total closest to 20? Be sure to include the total.

C. Herbert said, "If I pick $\boxed{1}$, $\boxed{4}$, and $\boxed{6}$, I can make 20 two different
ways."

Show two ways Herbert could make 20 with $\boxed{1}$, $\boxed{4}$, and $\boxed{6}$.

First way:

Second way:

Overall Percent Correct

Chinese Taipei	66	▲
Singapore	65	▲
Hungary	59	▲
England	59	▲
Japan	58	▲
United States	58	▲
Latvia	57	▲
Hong Kong, SAR	56	▲
Belgium (Flemish)	56	▲
Italy	55	▲
Cyprus	53	▲
New Zealand	53	▲
Russian Federation	53	▲
Netherlands	51	O
Scotland	51	▲
Lithuania	47	O
Slovenia	47	O
Australia	47	O
International average	**44**	
Norway	39	O
Moldova, Republic of	36	▼
Philippines	12	▼
Iran, Islamic Republic of	11	▼
Armenia	7	▼
Tunisia	4	▼
Morocco	0	▼

Country average vs. International average:	
Higher	▲
Not different	O
Lower	▼

Number tiles: get to 20 using 1,4,6 (continued)

Item Number: M031344C

SCORING

Correct Response

• Both ways correct 16 + 4 AND 14 + 6

Partially Correct Response

• Only one way correct 16 + 4 OR 14 + 6

Incorrect Response

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

Number tiles: get to 20 using 1,4,6 (continued)

Item Number: M031344C

Student Responses

Correct Response:

C. Herbert said, "If I pick ⬚1, ⬚4, and ⬚6, I can make 20 two different ways."

Show two ways Herbert could make 20 with ⬚1, ⬚4, and ⬚6.

First way:

$$\begin{array}{r} 14 \\ +\ 6 \\ \hline 20 \end{array}$$

Second way:

$$\begin{array}{r} 16 \\ +\ 4 \\ \hline 20 \end{array}$$

Partially Correct Response:

C. Herbert said, "If I pick ⬚1, ⬚4, and ⬚6, I can make 20 two different ways."

Show two ways Herbert could make 20 with ⬚1, ⬚4, and ⬚6.

First way:

$$\begin{array}{r} 14 \\ +\ 6 \\ \hline 20 \end{array}$$

Second way:

Number tiles: get to 20 using 1,4,6 (continued)

Item Number: M031344C

Student Responses (continued)

Incorrect Response:

C. Herbert said, "If I pick $\boxed{1}$, $\boxed{4}$, and $\boxed{6}$, I can make 20 two different ways."

Show two ways Herbert could make 20 with $\boxed{1}$, $\boxed{4}$, and $\boxed{6}$.

First way:

Second way:

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