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## RELEASED SCIENCE ITEMS

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This book contains the released Trends in International Mathematics and Science Study (TIMSS) 2011 grade 4 science assessment items. This is not a complete set of all TIMSS 2011 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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# USER'S GUIDE

## Grade 4

This book contains TIMSS 2011 released items for grade 4. Each item appears on a single page, on which is provided information about the item's classification and about international student performance on the item. The items appear in the content domain order, as shown in the index on the next page.

### Information about item classification

Take a look at the first item on page 1. Across the top are three boxes which identify the item's **content domain** (the subject matter in science that the item assesses), its **main topic** (the specific topic assessed within that subject matter), and its **cognitive domain** (the cognitive or thinking process assessed). For this item, the content domain is life science, the main topic is life cycles, reproduction and heredity, and the cognitive domain is applying.

Below the row of boxes and above a boxed-in area of the page is the **item label**. For this item, it is *How tadpoles get in the pond*. Below the boxed-in area is the item number, which is more commonly used to identify each item than the item label. Within the boxed-in area is the item as it appeared in student test booklets.

**Correct answers** are shown beneath each item. The correct answer for multiple-choice items is simply a letter code. For example, in the item *S031001* on page 1, the letter code D is the correct answer. The correct answers for write-in or open-ended items are explained in a scoring guide. For example, *Manuel's temperature rise* in the Life Science domain (page 10), provides an example

of a scoring guide, indicating the general nature of correct and incorrect 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 of the constructed-response items for each scoring category.

### Information about international student performance

In the table along the right-hand side of the page are the **percent correct** statistics for the item. These consist of statistics on the percentage of students in each education system who could answer the question correctly. The lists of education systems are ordered in terms of this percentage. The international average is included as well.

To the right of some of the percent correct statistics are **special symbols** that indicate when an education system scored significantly higher or significantly lower than the international average. Thus, on the item *How tadpoles get in the pond* as an example, an estimated 86 percent of U.S. students could correctly answer this item, a percentage that was measurably higher than the international average, after taking into account the standard of error associated with the percent correct statistic for the United States and for the international average.



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Grade 4

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Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Life Cycles, Reproduction, and Heredity	Applying

Item label: How tadpoles get in the pond

Melissa found some tadpoles and fish in a pond as shown above. How did the tadpoles get there?

- They hatched from eggs laid by fish in the pond.
- They formed from mud at the bottom of the pond.
- They were made from materials dissolved in pond water.
- They developed from eggs laid by frogs in the pond.

Item Number: S031001

<b>Correct Response:</b>	<b>D</b>
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**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	97 ▲
Japan	95 ▲
Netherlands	93 ▲
Singapore	93 ▲
Slovenia	92 ▲
Poland	91 ▲
Chinese Taipei-CHN	90 ▲
Finland	90 ▲
Hong Kong-CHN	90 ▲
Germany	90 ▲
Austria	89 ▲
Northern Ireland-GBR	89 ▲
Ireland	88 ▲
Belgium (Flemish)-BEL	88 ▲
England-GBR	87 ▲
Denmark	87 ▲
Czech Republic	87 ▲
Australia	86 ▲
Sweden	86 ▲
Italy	86 ▲
<b>United States</b>	<b>86 ▲</b>
Russian Federation	85 ▲
Norway	85 ▲
Croatia	84 ▲
Thailand	82 ▲
Portugal	82 ▲
Lithuania	82 ▲
New Zealand	81 ▲
Spain	80 ▲
Hungary	80
Serbia	77
Slovak Republic	77
<b>International average</b>	<b>76</b>
Romania	76
Malta	75
Iran, Islamic Rep of.	75
Chile	72 ▼
Turkey	68 ▼
United Arab Emirates	65 ▼
Bahrain	65 ▼
Kazakhstan	65 ▼
Azerbaijan	63 ▼
Oman	63 ▼
Georgia	59 ▼
Qatar	57 ▼
Saudi Arabia	54 ▼
Armenia	52 ▼
Kuwait	43 ▼
Tunisia	38 ▼
Morocco	33 ▼
Yemen	21 ▼

Benchmarking education system	Percent correct
Quebec-CAN	87 ▲
North Carolina-USA	87 ▲
Florida-USA	86 ▲
Alberta-CAN	86 ▲
Ontario-CAN	84 ▲
Dubai-UAE	73 ▼
Abu Dhabi-UAE	59 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying

Item label: Birds/bats/butterflies share

What do birds, bats and butterflies have in common?

A. feathers

B. hair

C. internal skeleton

D. wings

Item Number: S031230

Correct Response:	D
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### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	99 ▲
<b>United States</b>	<b>96 ▲</b>
Croatia	95 ▲
Singapore	95 ▲
Finland	95 ▲
Sweden	95 ▲
Ireland	95 ▲
Austria	94 ▲
England-GBR	94 ▲
Norway	93 ▲
Germany	93 ▲
New Zealand	93 ▲
Portugal	92 ▲
Russian Federation	92 ▲
Australia	92 ▲
Slovenia	91 ▲
Netherlands	91 ▲
Northern Ireland-GBR	91 ▲
Denmark	91 ▲
Serbia	91 ▲
Czech Republic	90 ▲
Poland	90 ▲
Slovak Republic	89 ▲
Italy	89 ▲
Lithuania	89 ▲
Belgium (Flemish)-BEL	88 ▲
Spain	87 ▲
Japan	87 ▲
Thailand	86
Georgia	86
Hungary	84
Chile	84
<b>International average</b>	<b>83</b>
Armenia	83
Chinese Taipei-CHN	83
Romania	83
Malta	82
Hong Kong-CHN	79
Kazakhstan	79 ▼
Turkey	79 ▼
Bahrain	75 ▼
Azerbaijan	75 ▼
United Arab Emirates	74 ▼
Saudi Arabia	70 ▼
Iran, Islamic Rep. of	62 ▼
Qatar	62 ▼
Tunisia	61 ▼
Oman	61 ▼
Kuwait	54 ▼
Morocco	47 ▼
Yemen	31 ▼
<b>Benchmarking education system</b>	
Florida-USA	97 ▲
Alberta-CAN	96 ▲
North Carolina-USA	95 ▲
Ontario-CAN	93 ▲
Quebec-CAN	92 ▲
Dubai-UAE	79 ▼
Abu Dhabi-UAE	70 ▼

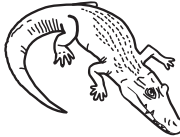
▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying


Item label: Main features of four animals




Monkey



Crocodile



Grasshopper



Octopus

Answer the following questions using the animals shown above. Write the name for the correct animal in the spaces below.

A. Which animal has an internal skeleton and produces milk for its young?

\_\_\_\_\_

B. Which animal has an external skeleton and three pairs of legs?

\_\_\_\_\_

C. Which animal has a soft body and no skeleton?

\_\_\_\_\_

Item Number: S031233

**SCORING**

**Correct Response**

- Identifies all 3 animals in the correct order: monkey, grasshopper, octopus

**Incorrect Response**

- Identifies one animal correctly.
- Identifies two animals correctly.
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	88 ▲
Singapore	83 ▲
Hungary	80 ▲
Italy	79 ▲
Denmark	76 ▲
Slovak Republic	75 ▲
Portugal	74 ▲
Russian Federation	72 ▲
Japan	70 ▲
Australia	70 ▲
<b>United States</b>	<b>69 ▲</b>
Chinese Taipei-CHN	69 ▲
Hong Kong-CHN	69 ▲
England-GBR	67 ▲
Belgium (Flemish)-BEL	66 ▲
Germany	66 ▲
Northern Ireland-GBR	66 ▲
Sweden	65 ▲
Croatia	65 ▲
Thailand	64
Spain	64 ▲
Poland	64 ▲
Finland	64 ▲
Norway	63 ▲
Czech Republic	63
Austria	63 ▲
Lithuania	63 ▲
Netherlands	60
Chile	60
New Zealand	59
Slovenia	58
<b>International average</b>	<b>58</b>
Ireland	58
Kazakhstan	57
Malta	54
Romania	53
Turkey	53 ▼
Serbia	51 ▼
Iran, Islamic Rep. of	50 ▼
Bahrain	49 ▼
Azerbaijan	47 ▼
United Arab Emirates	45 ▼
Georgia	44 ▼
Armenia	38 ▼
Qatar	38 ▼
Saudi Arabia	33 ▼
Oman	31 ▼
Kuwait	29 ▼
Tunisia	26 ▼
Morocco	16 ▼
Yemen	14 ▼

Benchmarking education system	Percent correct
North Carolina-USA	74 ▲
Florida-USA	72 ▲
Quebec-CAN	68 ▲
Alberta-CAN	66 ▲
Ontario-CAN	63 ▲
Dubai-UAE	48 ▼
Abu Dhabi-UAE	41 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Main features of four animals (continued)

S031233:

## Student Responses

### Correct Response:

A. Which animal has an internal skeleton and produces milk for its young?

monkey

B. Which animal has an external skeleton and three pairs of legs?

grasshopper

C. Which animal has a soft body and no skeleton?

octopus

### Incorrect Response:

A. Which animal has an internal skeleton and produces milk for its young?

crocodile

B. Which animal has an external skeleton and three pairs of legs?

Grasshopper

C. Which animal has a soft body and no skeleton?

monkey

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Knowing

Item label: Bird's foot structure

A bird that lives on a pond is most likely to have which of these foot structures?

A. B. C. D.

Item Number: S031236

<b>Correct Response:</b>	<b>D</b>
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**Overall Percent Correct**

Education system	Percent correct
Netherlands	92 ▲
Slovak Republic	91 ▲
Hungary	89 ▲
Czech Republic	89 ▲
Norway	89 ▲
Denmark	87 ▲
Germany	87 ▲
Russian Federation	86 ▲
Northern Ireland-GBR	86 ▲
Poland	86 ▲
Belgium (Flemish)-BEL	86 ▲
Lithuania	86 ▲
Austria	86 ▲
Australia	85 ▲
New Zealand	84 ▲
<b>United States</b>	<b>84 ▲</b>
Sweden	83 ▲
England-GBR	83 ▲
Slovenia	82 ▲
Romania	82 ▲
Korea, Rep. of	81 ▲
Finland	81 ▲
Italy	81 ▲
Ireland	80 ▲
Chinese Taipei-CHN	80 ▲
Portugal	79 ▲
Chile	76 ▲
Croatia	75
Singapore	75 ▲
Armenia	73
Azerbaijan	72
<b>International average</b>	<b>72</b>
Japan	71
Serbia	69
Iran, Islamic Rep. of	69
Tunisia	69
Spain	66 ▼
Malta	59 ▼
Georgia	57 ▼
Saudi Arabia	56 ▼
United Arab Emirates	55 ▼
Thailand	55 ▼
Oman	54 ▼
Hong Kong-CHN	50 ▼
Kazakhstan	48 ▼
Qatar	46 ▼
Turkey	44 ▼
Bahrain	43 ▼
Kuwait	41 ▼
Morocco	33 ▼
Yemen	16 ▼

**Benchmarking education system**

Alberta-CAN	85 ▼
North Carolina-USA	84 ▼
Ontario-CAN	82 ▼
Florida-USA	78 ▼
Quebec-CAN	69
Dubai-UAE	65 ▼
Abu Dhabi-UAE	53 ▼

▲ Percent higher than International average  
▼ Percent lower than International average



Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Life Cycles, Reproduction, and Heredity	Knowing

Item label: Animal with young and adult forms

Which of these animals has a young form that looks the most like the adult form?

A. moth

B. human

C. frog

D. butterfly

Item Number: S031254

Correct Response:	<b>B</b>
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### Overall Percent Correct

Education system	Percent correct
Chinese Taipei-CHN	86 ▲
Japan	83 ▲
Korea, Rep. of	79 ▲
Hungary	78 ▲
Italy	78 ▲
Singapore	76 ▲
Russian Federation	74 ▲
Kazakhstan	72 ▲
Slovenia	72 ▲
Slovak Republic	71 ▲
Hong Kong-CHN	68 ▲
Romania	68 ▲
Czech Republic	67 ▲
Portugal	67 ▲
Finland	65 ▲
Iran, Islamic Rep. of	62 ▲
Denmark	57
Belgium (Flemish)-BEL	57
Georgia	56
Norway	56
Spain	55
<b>International average</b>	<b>54</b>
Ireland	54
Australia	54
England-GBR	52
Turkey	52
Austria	50 ▼
Sweden	50
<b>United States</b>	<b>50 ▼</b>
New Zealand	49 ▼
Azerbaijan	49 ▼
Saudi Arabia	48 ▼
Chile	47 ▼
Malta	46 ▼
Poland	45 ▼
Serbia	45 ▼
Netherlands	44 ▼
Germany	44 ▼
United Arab Emirates	43 ▼
Qatar	42 ▼
Armenia	42 ▼
Northern Ireland-GBR	41 ▼
Morocco	39 ▼
Bahrain	39 ▼
Croatia	38 ▼
Thailand	35 ▼
Yemen	32 ▼
Oman	31 ▼
Kuwait	31 ▼
Tunisia	28 ▼
Lithuania	—

### Benchmarking education system

Alberta-CAN	55
Quebec-CAN	54
Ontario-CAN	52
North Carolina-USA	51
Florida-USA	47 ▼
Abu Dhabi-UAE	42 ▼
Dubai-UAE	41 ▼

▲ Percent higher than International average

▼ Percent lower than International average

— Not applicable

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Life Cycles, Reproduction, and Heredity	Reasoning

Item label: Only female Siberian tigers left

Some animals are very rare. For example, there are very few Siberian tigers. If the only Siberian tigers left are female, what will most likely happen?

- A. The females will find another type of male animal to mate with and produce more Siberian tigers.
- B. The females will mate with each other and produce more Siberian tigers.
- C. The females will only be able to produce female Siberian tigers.
- D. The females will not be able to produce more Siberian tigers, and they will die out.

Item Number: S031266

**Correct Response:**

**D**

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	88 ▲
Slovak Republic	76 ▲
Russian Federation	75 ▲
Hungary	74 ▲
Singapore	74 ▲
Hong Kong-CHN	72 ▲
Sweden	72 ▲
Finland	71 ▲
Denmark	69 ▲
Croatia	67 ▲
Chinese Taipei-CHN	67 ▲
Spain	67 ▲
Slovenia	65 ▲
Netherlands	64 ▲
<b>United States</b>	<b>64 ▲</b>
England-GBR	63 ▲
Czech Republic	62 ▲
Norway	62 ▲
Poland	61 ▲
Lithuania	60 ▲
Australia	60 ▲
Germany	59 ▲
Romania	58
Thailand	58 ▲
Serbia	58 ▼
Austria	56
Italy	56
Japan	56
Northern Ireland-GBR	56
Ireland	55
Chile	54
<b>International average</b>	<b>53</b>
New Zealand	52
Portugal	51
Turkey	49 ▼
Kazakhstan	47 ▼
Belgium (Flemish)-BEL	47 ▼
Malta	46 ▼
Georgia	39 ▼
Armenia	36 ▼
Azerbaijan	36 ▼
Bahrain	34 ▼
United Arab Emirates	32 ▼
Saudi Arabia	32 ▼
Kuwait	28 ▼
Qatar	28 ▼
Iran, Islamic Rep. of	28 ▼
Oman	24 ▼
Morocco	22 ▼
Yemen	20 ▼
Tunisia	20 ▼

### Benchmarking education system

North Carolina-USA	70 ▲
Quebec-CAN	65 ▲
Alberta-CAN	58
Florida-USA	58
Ontario-CAN	52
Dubai-UAE	37 ▼
Abu Dhabi-UAE	29 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Knowing

Item label: Why birds sit on their eggs

Most birds sit on their eggs until they hatch. Which of these is the most important reason why birds sit on their eggs?

- A. to keep the eggs inside the nest
- B. to keep the eggs warm
- C. to protect the eggs from the wind
- D. to protect the eggs from the rain

Item Number: S031281

Correct Response:

**B**

### Overall Percent Correct

Education system	Percent correct
Netherlands	96 ▲
Finland	96 ▲
Austria	95 ▲
Czech Republic	94 ▲
Belgium (Flemish)-BEL	94 ▲
<b>United States</b>	<b>94 ▲</b>
Sweden	93 ▲
Denmark	93 ▲
Singapore	93 ▲
Germany	92 ▲
Slovenia	92 ▲
Australia	92 ▲
Ireland	92 ▲
Norway	91 ▲
Croatia	91 ▲
Slovak Republic	91 ▲
Northern Ireland-GBR	91 ▲
Hungary	89 ▲
Spain	89 ▲
Russian Federation	89 ▲
England-GBR	89 ▲
Poland	88 ▲
Japan	87 ▲
New Zealand	87 ▲
Italy	87 ▲
Serbia	87 ▲
Chinese Taipei-CHN	86 ▲
Portugal	85 ▲
Korea, Rep. of	85 ▲
Romania	84 ▲
Hong Kong-CHN	84 ▲
Lithuania	83
Malta	81
Chile	80
Azerbaijan	80
<b>International average</b>	<b>79</b>
Georgia	79
Turkey	77
Kazakhstan	70 ▼
Thailand	69 ▼
Iran, Islamic Rep. of	67 ▼
Armenia	66 ▼
United Arab Emirates	64 ▼
Bahrain	59 ▼
Qatar	57 ▼
Saudi Arabia	54 ▼
Tunisia	46 ▼
Oman	43 ▼
Kuwait	40 ▼
Morocco	31 ▼
Yemen	31 ▼

### Benchmarking education system

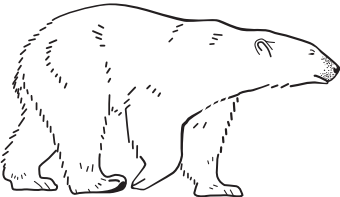
North Carolina-USA	95 ▲
Alberta-CAN	93 ▲
Florida-USA	91 ▲
Quebec-CAN	91 ▲
Ontario-CAN	90 ▲
Dubai-UAE	73 ▼
Abu Dhabi-UAE	58 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

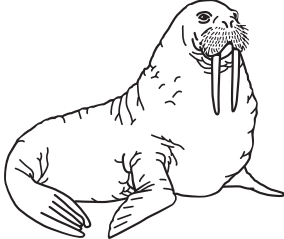
Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Applying

Item label: What walrus has to keep it warm

polar bear



walrus



Polar bears and walruses look very different, but both can survive in the extreme cold. A polar bear has a thick coat of fur that helps keep it warm. The walrus has no fur.

What does the walrus have that helps it keep warm?

- A. fat layers
- B. tusks
- C. whiskers
- D. flippers

Item Number: S031291

<b>Correct Response:</b>	<b>A</b>
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**Overall Percent Correct**

Education system	Percent correct
Finland	98 ▲
Russian Federation	97 ▲
Czech Republic	95 ▲
Italy	95 ▲
Austria	94 ▲
Germany	94 ▲
Sweden	94 ▲
Netherlands	93 ▲
Lithuania	93 ▲
Chile	93 ▲
Poland	92 ▲
Denmark	92 ▲
Northern Ireland-GBR	92 ▲
<b>United States</b>	<b>91 ▲</b>
Hungary	91 ▲
Spain	90 ▲
Slovak Republic	90 ▲
Korea, Rep. of	90 ▲
Australia	90 ▲
England-GBR	89 ▲
Hong Kong-CHN	89 ▲
Ireland	88 ▲
Croatia	88 ▲
New Zealand	88 ▲
Georgia	88 ▲
Portugal	87 ▲
Azerbaijan	87 ▲
Belgium (Flemish)-BEL	87 ▲
Serbia	86 ▲
Kazakhstan	86 ▲
Singapore	86 ▲
Chinese Taipei-CHN	85 ▲
Japan	85 ▲
Slovenia	84
Romania	83
<b>International average</b>	<b>81</b>
Thailand	80
Norway	79
Iran, Islamic Rep. of	72 ▼
Armenia	71 ▼
Turkey	70 ▼
Malta	70 ▼
Bahrain	70 ▼
United Arab Emirates	63 ▼
Saudi Arabia	59 ▼
Qatar	58 ▼
Tunisia	47 ▼
Oman	44 ▼
Kuwait	44 ▼
Morocco	27 ▼
Yemen	25 ▼

**Benchmarking education system**

Quebec-CAN	94 ▲
Florida-USA	94 ▲
North Carolina-USA	93 ▲
Alberta-CAN	92 ▲
Ontario-CAN	90 ▲
Dubai-UAE	70 ▼
Abu Dhabi-UAE	59 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Human Health	Applying

Item label: Manuel's temperature rise

The normal temperature of the human body is about 98.6 degrees Fahrenheit. Manuel takes his temperature one morning after waking up. His body temperature is 104 degrees Fahrenheit.

Write down one thing that could have caused his temperature to be higher than normal.

### Overall Percent Correct

Education system	Percent correct
Norway	64 ▲
Hong Kong-CHN	63 ▲
Belgium (Flemish)-BEL	62 ▲
Denmark	61 ▲
Italy	60 ▲
Sweden	59 ▲
Croatia	58 ▲
Hungary	57 ▲
Finland	57 ▲
Chinese Taipei-CHN	57 ▲
Slovak Republic	55 ▲
Czech Republic	55 ▲
Russian Federation	54 ▲
<b>United States</b>	<b>52 ▲</b>
Netherlands	52 ▲
Lithuania	52 ▲
Slovenia	50 ▲
Singapore	50 ▲
Portugal	48 ▲
Japan	47 ▲
Poland	45 ▲
Serbia	45 ▲
Spain	41
Kazakhstan	40
Romania	39
Turkey	39
<b>International average</b>	<b>39</b>
Ireland	38
Austria	37
Korea, Rep. of	36
Azerbaijan	35
Georgia	33 ▼
Australia	32 ▼
Chile	32 ▼
Armenia	31 ▼
Northern Ireland-GBR	30 ▼
Bahrain	28 ▼
England-GBR	25 ▼
New Zealand	25 ▼
Germany	24 ▼
United Arab Emirates	24 ▼
Thailand	22 ▼
Saudi Arabia	21 ▼
Malta	20 ▼
Tunisia	20 ▼
Iran, Islamic Rep. of	18 ▼
Qatar	16 ▼
Oman	16 ▼
Yemen	8 ▼
Kuwait	7 ▼
Morocco	5 ▼
<b>Benchmarking education system</b>	
Florida-USA	51 ▲
North Carolina-USA	50 ▲
Quebec-CAN	46 ▲
Ontario-CAN	37
Alberta-CAN	37
Dubai-UAE	32 ▼
Abu Dhabi-UAE	21 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S031325

### SCORING

#### Correct Response

- Refers to Manuel being sick, having a fever, or similar.

Examples:

He was ill.

He had an infection.

He was running a fever.

#### Incorrect Response

- Refers only to getting cold, wet, or similar. [Reflects misconception about cause of illness.]

Example: He was out in the cold the night before.

- Refers only to a factor affecting external temperature.

Example: The weather was too hot.

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

Item label: Manuel's temperature rise (continued)

S031325:

## Student Responses

### Correct Response:

Write down one thing that could have caused his temperature to be higher than normal.

He might have caught  
a fever.

### Incorrect Response:

Write down one thing that could have caused his temperature to be higher than normal.

It could be that he ate alot and he didn't  
so posto. He could on the rain. Or maybe  
he didn't take of himself.

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Human Health	Knowing

Item label: Best source of calcium

Calcium is a mineral that helps make your bones and teeth strong. Which of these foods is the best source of calcium?

A. candy  
 B. rice  
 C. cheese  
 D. meat

Item Number: S031340

<b>Correct Response:</b>	<b>C</b>
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**Overall Percent Correct**

Education system	Percent correct
Finland	83 ▲
Singapore	77 ▲
Thailand	71 ▲
Japan	70 ▲
Ireland	70 ▲
Portugal	65 ▲
Turkey	65 ▲
Spain	65 ▲
Northern Ireland-GBR	64 ▲
Romania	63 ▲
Denmark	62 ▲
Italy	62 ▲
Czech Republic	60 ▲
Chile	58 ▲
Slovak Republic	58 ▲
Hong Kong-CHN	55 ▲
England-GBR	55 ▲
Chinese Taipei-CHN	53 ▲
Australia	53 ▲
Korea, Rep. of	53 ▲
Azerbaijan	52 ▲
New Zealand	51
<b>International average</b>	<b>47</b>
<b>United States</b>	<b>47</b>
Belgium (Flemish)-BEL	46
Netherlands	45
Hungary	44
Poland	44
Lithuania	42 ▼
Saudi Arabia	41 ▼
Malta	39 ▼
Serbia	37 ▼
Bahrain	37 ▼
Oman	36 ▼
Armenia	36 ▼
Georgia	35 ▼
Qatar	35 ▼
Sweden	34 ▼
Tunisia	34 ▼
Russian Federation	34 ▼
Kuwait	34 ▼
United Arab Emirates	31 ▼
Kazakhstan	30 ▼
Croatia	29 ▼
Morocco	29 ▼
Norway	29 ▼
Yemen	28 ▼
Iran, Islamic Rep. of	27 ▼
Austria	27 ▼
Germany	25 ▼
Slovenia	23 ▼

**Benchmarking education system**

Ontario-CAN	69 ▲
Quebec-CAN	66 ▲
Alberta-CAN	60 ▲
North Carolina-USA	52
Florida-USA	43
Dubai-UAE	39 ▼
Abu Dhabi-UAE	31 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Knowing

Item label: Which animal is a predator

A predator is an animal that feeds on other animals.  
Which of these is a predator?

A. deer

B. wolf

C. cow

D. goat

Item Number: S031356

Correct Response:	<b>B</b>
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### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	99 ▲
Finland	98 ▲
Netherlands	98 ▲
Russian Federation	98 ▲
Poland	97 ▲
Lithuania	97 ▲
Kazakhstan	96 ▲
Croatia	96 ▲
Italy	96 ▲
Czech Republic	96 ▲
Austria	96 ▲
Hungary	95 ▲
Georgia	95 ▲
Belgium (Flemish)-BEL	95 ▲
Azerbaijan	95 ▲
Germany	94 ▲
Slovak Republic	93 ▲
Armenia	93 ▲
Iran, Islamic Rep. of	93 ▲
Spain	92 ▲
Serbia	92 ▲
Slovenia	91 ▲
Northern Ireland-GBR	91
Thailand	91
<b>United States</b>	<b>90 ▲</b>
Hong Kong-CHN	90 ▲
Denmark	90
Romania	89
Sweden	89
Chile	89
Singapore	88
Norway	88
Portugal	88
<b>International average</b>	<b>88</b>
England-GBR	87
Australia	87
Turkey	86
New Zealand	86
Ireland	86
Chinese Taipei-CHN	83 ▼
Bahrain	83 ▼
Japan	83 ▼
Saudi Arabia	83 ▼
Tunisia	81 ▼
Kuwait	74 ▼
United Arab Emirates	74 ▼
Oman	73 ▼
Morocco	62 ▼
Qatar	61 ▼
Malta	58 ▼
Yemen	54 ▼

### Benchmarking education system

Quebec-CAN	94 ▲
Florida-USA	93 ▲
Alberta-CAN	91 ▲
North Carolina-USA	89
Ontario-CAN	87
Abu Dhabi-UAE	75 ▼
Dubai-UAE	70 ▼

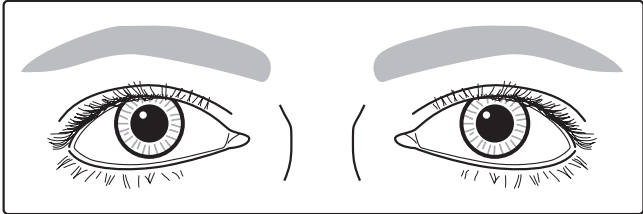
▲ Percent higher than International average  
▼ Percent lower than International average



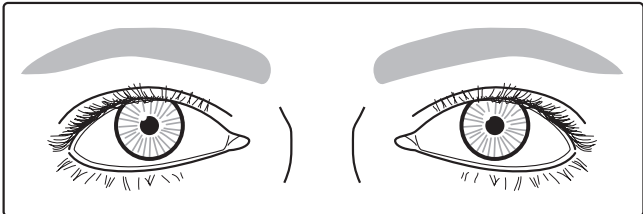
Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Reasoning

Item label: Eyes in different outside conditions

Picture 1



Picture 2



Picture 1 and Picture 2 show the same eyes in different outside conditions. What outside condition is different between Picture 1 and Picture 2?

- Light is brighter in Picture 1.
- Light is brighter in Picture 2.
- Temperature is higher in Picture 1.
- Temperature is higher in Picture 2.

Item Number: S031361

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Finland	77 ▲
Chinese Taipei-CHN	74 ▲
Hong Kong-CHN	74 ▲
Netherlands	69 ▲
Singapore	68 ▲
Germany	68 ▲
Portugal	68 ▲
Sweden	68 ▲
<b>United States</b>	<b>66 ▲</b>
Denmark	65 ▲
England-GBR	65 ▲
Slovenia	65 ▲
Korea, Rep. of	62 ▲
Australia	62 ▲
Hungary	62 ▲
Spain	61 ▲
Belgium (Flemish)-BEL	61 ▲
Ireland	60
Italy	60
Chile	60
Slovak Republic	60
New Zealand	59
Austria	59
Turkey	59
Japan	59
Russian Federation	58
Czech Republic	57
Romania	57
Northern Ireland-GBR	56
<b>International average</b>	<b>56</b>
Croatia	54
Qatar	53
Serbia	52
Poland	51 ▼
United Arab Emirates	51 ▼
Norway	51
Malta	51 ▼
Saudi Arabia	51 ▼
Kazakhstan	50 ▼
Armenia	49 ▼
Thailand	49 ▼
Lithuania	47 ▼
Bahrain	46 ▼
Iran, Islamic Rep. of	46 ▼
Azerbaijan	43 ▼
Oman	42 ▼
Kuwait	40 ▼
Georgia	35 ▼
Yemen	32 ▼
Morocco	32 ▼
Tunisia	30 ▼

Benchmarking education system	Percent correct
North Carolina-USA	70 ▲
Florida-USA	70 ▲
Alberta-CAN	65 ▲
Ontario-CAN	60
Dubai-UAE	56
Quebec-CAN	54
Abu Dhabi-UAE	50 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Applying

Item label: Animal extinction-DERIVED

Describe two human activities that can lead to the extinction of animals.

Activity 1:

Activity 2:

Item Number: S031390Z

**SCORING**

Note: Each of the two responses are scored separately. However, if the two responses are essentially the same, the second response should be scored as "Incorrect Response".

**Correct Response**

- Mentions tree felling or other land development activities (leading to loss of habitat/homes).

Example: Cutting down trees.

- Mentions hunting or killing animals (for food, pelts, etc.).

Example: Shooting animals and eating them.

- Mentions polluting the environment (or similar).

Example: Causing air pollution.

- Other correct

**Incorrect Response**

- Mentions a human activity but connection to extinction of animals is unclear.

Example: Smoking

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

**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	54 ▲
Russian Federation	44 ▲
Italy	44 ▲
Poland	41 ▲
Netherlands	41 ▲
Sweden	40 ▲
Thailand	40 ▲
Romania	38 ▲
Chinese Taipei-CHN	38 ▲
Denmark	38 ▲
Austria	38 ▲
Finland	38 ▲
Slovak Republic	37 ▲
Serbia	36 ▲
Hungary	36 ▲
Kazakhstan	34 ▲
Czech Republic	33 ▲
Germany	33 ▲
Georgia	33
Ireland	32
Croatia	31
England-GBR	30
Singapore	29
Spain	29
<b>United States</b>	<b>29</b>
Iran, Islamic Rep. of	28
Slovenia	28
<b>International average</b>	<b>28</b>
Lithuania	27
Belgium (Flemish)-BEL	27
Australia	26
Northern Ireland-GBR	26
Portugal	25
Bahrain	23 ▼
New Zealand	23 ▼
Armenia	23 ▼
Saudi Arabia	23 ▼
Turkey	22 ▼
Hong Kong-CHN	20 ▼
Azerbaijan	19 ▼
Kuwait	19 ▼
Chile	19 ▼
Malta	16 ▼
Japan	16 ▼
United Arab Emirates	14 ▼
Norway	13 ▼
Qatar	12 ▼
Tunisia	11 ▼
Oman	10 ▼
Morocco	6 ▼
Yemen	1 ▼

**Benchmarking education system**

Alberta-CAN	38 ▲
Ontario-CAN	36 ▲
Florida-USA	29
Quebec-CAN	28
North Carolina-USA	24
Dubai-UAE	17 ▼
Abu Dhabi-UAE	14 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Animal extinction (continued)

S031390Z:

## Student Responses

### Correct Response:

Activity 1: hunting

Activity 2: tearing down forests

### Incorrect Response:

Activity 1: Leave toys in water

Activity 2: play with matches in woods

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Knowing

Item label: Living-nonliving things in a pond

The picture below shows a pond.

In the spaces provided below, list three living things and three non-living things shown in this picture.

Living things	Non-living things
1.	1.
2.	2.
3.	3.

Item Number: S041003

### SCORING

#### Correct Response

- Acceptable lists of living things: fish, frog, turtle, dragonfly (insect, butterfly, fly), water lily (plants, flowering plant, water plant), trees, grasses, molluscs (snails)
- Acceptable lists of non-living things: sun, clouds, water, rocks, pebbles (stones), sand, soil (dirt, earth), mud, air

#### Incorrect Response

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

### Overall Percent Correct

Education system	Percent correct
Singapore	88 ▲
Serbia	75 ▲
Hungary	70 ▲
Kazakhstan	69 ▲
Italy	67 ▲
Finland	66 ▲
Spain	66 ▲
Slovak Republic	66 ▲
Croatia	65 ▲
Chile	64 ▲
Turkey	62 ▲
Thailand	61 ▲
Russian Federation	60 ▲
Slovenia	58 ▲
<b>United States</b>	<b>58 ▲</b>
Czech Republic	55 ▲
Oman	55 ▲
Bahrain	55 ▲
Lithuania	54 ▲
Netherlands	52 ▲
Australia	49
Sweden	48
<b>International average</b>	<b>47</b>
United Arab Emirates	47
Azerbaijan	47
Iran, Islamic Rep. of	47
Korea, Rep. of	46
Portugal	46
England-GBR	46
Romania	45
Denmark	45
Malta	44
Norway	43
New Zealand	42 ▼
Ireland	41 ▼
Saudi Arabia	40 ▼
Qatar	40 ▼
Germany	40 ▼
Hong Kong-CHN	39 ▼
Japan	39 ▼
Belgium (Flemish)-BEL	38 ▼
Northern Ireland-GBR	34 ▼
Austria	31 ▼
Armenia	30 ▼
Poland	21 ▼
Morocco	20 ▼
Georgia	19 ▼
Kuwait	19 ▼
Chinese Taipei-CHN	17 ▼
Tunisia	15 ▼
Yemen	13 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	63 ▲
Ontario-CAN	56 ▲
Florida-USA	56 ▲
Quebec-CAN	52 ▲
Dubai-UAE	52 ▲
North Carolina-USA	42
Abu Dhabi-UAE	41 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Living-nonliving things in a pond (continued)

S041003:

## Student Responses

### Correct Response:

Living things

1. frogs

2. fish

3. turtles

Non-living things

1. oceans

2. rocks

3. clouds

### Incorrect Response:

Living things

1. frog

2. frog

3. fly

Non-living things

1. rock

2. tree

3. flower

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying

Item label: Use of tiger canines

The diagrams show a tiger skull and a rat skull.

tiger skull                      rat skull

A tiger has very large teeth called canines. A rat has very large teeth called incisors. A tiger and a rat eat different types of food.

A. What does a tiger use its canines for?

Item Number: S041013A

**SCORING**

**Correct Response**

- States that the tiger uses its canines for piercing (stabbing, holding, ripping, killing, tearing) prey.

Examples:

A tiger uses its canines to hold onto its prey and kill it.

The tiger stabs its prey with the canines and rips the meat.

**Incorrect Response**

- States that the tiger uses its canines for chewing (crushing, grinding) food.

Example: A tiger uses its canines for chewing its prey.

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

Examples:

To eat his prey.

To devour its prey.

The tiger uses them for meat.

**Overall Percent Correct**

Education system	Percent correct
Denmark	62 ▲
Kazakhstan	55 ▲
Russian Federation	51 ▲
Hungary	50 ▲
Ireland	50 ▲
England-GBR	48 ▲
Slovenia	47 ▲
Italy	47 ▲
Austria	45 ▲
Sweden	45 ▲
Northern Ireland-GBR	44 ▲
Czech Republic	43 ▲
Germany	42 ▲
Belgium (Flemish)-BEL	42 ▲
Finland	40 ▲
Australia	40 ▲
Slovak Republic	40 ▲
<b>United States</b>	<b>38 ▲</b>
Netherlands	38 ▲
Romania	37 ▲
Singapore	37 ▲
Norway	37
New Zealand	36 ▲
Poland	35
Lithuania	33
<b>International average</b>	<b>31</b>
Tunisia	30
Croatia	28
Spain	27 ▼
Azerbaijan	26 ▼
Serbia	26 ▼
Malta	24 ▼
Chile	24 ▼
Korea, Rep. of	24 ▼
Armenia	23 ▼
Portugal	23 ▼
Japan	23 ▼
United Arab Emirates	22 ▼
Bahrain	20 ▼
Iran, Islamic Rep. of	19 ▼
Saudi Arabia	19 ▼
Hong Kong-CHN	18 ▼
Georgia	18 ▼
Qatar	17 ▼
Chinese Taipei-CHN	16 ▼
Turkey	16 ▼
Thailand	15 ▼
Oman	13 ▼
Kuwait	6 ▼
Yemen	5 ▼
Morocco	3 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	44 ▲
North Carolina-USA	40 ▲
Ontario-CAN	37 ▲
Florida-USA	37 ▲
Dubai-UAE	32
Quebec-CAN	22 ▼
Abu Dhabi-UAE	17 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Use of tiger canines (continued)

S041013A:

## Student Responses

### Correct Response:

It uses the canines for killing the other animals.

### Incorrect Response:

for biting the hard  
bones in the food

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying

Item label: Use of rat incisors

The diagrams show a tiger skull and a rat skull.

tiger skull                      rat skull

A tiger has very large teeth called canines. A rat has very large teeth called incisors. A tiger and a rat eat different types of food.

B. What does a rat use its incisors for?

Item Number: S041013B

### SCORING

#### Correct Response

- States that the rat uses its incisors for gnawing (nibbling) food or killing prey.

Examples:

The rat uses them to gnaw nuts, grains, meat, and vegetable matter.

The rat uses its incisors for biting hard stuff.

#### Incorrect Response

- States that the rat uses its incisors for chewing (crushing, grinding, cutting, chopping, munching) food.

Examples:

Rats use their incisors for chewing softer things.

Rats use them to grind food.

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

Example: It uses them for vegetables.

### Overall Percent Correct

Education system	Percent correct
Finland	54 ▲
Denmark	52 ▲
Sweden	48 ▲
Thailand	47 ▲
Lithuania	45 ▲
Norway	43 ▲
Japan	41 ▲
Kazakhstan	40 ▲
Portugal	39 ▲
Russian Federation	38 ▲
Romania	34 ▲
Chinese Taipei-CHN	33 ▲
Korea, Rep. of	33 ▲
Serbia	30 ▲
Hungary	29 ▲
Italy	29 ▲
Czech Republic	27
Slovenia	26
Austria	24
<b>International average</b>	<b>23</b>
Northern Ireland-GBR	23
Netherlands	21
Slovak Republic	21
Armenia	21
Ireland	21
Poland	20
Georgia	20
Chile	19 ▼
England-GBR	19
Turkey	19 ▼
Croatia	19 ▼
Germany	18 ▼
Spain	18 ▼
Bahrain	17 ▼
Iran, Islamic Rep. of	17 ▼
New Zealand	16 ▼
Australia	15 ▼
Belgium (Flemish)-BEL	15 ▼
Tunisia	14 ▼
Azerbaijan	14 ▼
Singapore	13 ▼
<b>United States</b>	<b>13</b> ▼
Malta	12 ▼
United Arab Emirates	4 ▼
Oman	4 ▼
Qatar	4 ▼
Hong Kong-CHN	2 ▼
Saudi Arabia	2 ▼
Kuwait	1 ▼
Morocco	1 ▼
Yemen	# ▼
<b>Benchmarking education system</b>	
Alberta-CAN	15 ▼
Quebec-CAN	15 ▼
North Carolina-USA	13 ▼
Florida-USA	13 ▼
Ontario-CAN	12 ▼
Dubai-UAE	6 ▼
Abu Dhabi-UAE	3 ▼

▲ Percent higher than International average

▼ Percent lower than International average

# Rounds to zero



Item label: Use of rat incisors (continued)

S041013B:

## Student Responses

### Correct Response:

Rats uses there incisors for naving<sup>on</sup> hard vegtables,

### Incorrect Response:

The rat uses it's incisors for chopping up it's food

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying

Item label: One function of fruit

Some plants produce fruit such as apples.

What is one function of a fruit?

- A. to protect seeds
- B. to produce food for seeds
- C. to stop seeds from dispersing
- D. to store water for seed germination

Item Number: S041014

**Correct Response:****A****Overall Percent Correct**

Education system	Percent correct
Singapore	61 ▲
Romania	45 ▲
Korea, Rep. of	44 ▲
Slovak Republic	41 ▲
Italy	41 ▲
<b>United States</b>	<b>41 ▲</b>
<i>Chinese Taipei-CHN</i>	40 ▲
Azerbaijan	39 ▲
Slovenia	38 ▲
Poland	35 ▲
Russian Federation	35
Finland	34
Spain	34
Portugal	34
Morocco	34
Kazakhstan	33
United Arab Emirates	33
Serbia	33
Bahrain	32
Ireland	32
<i>Hong Kong-CHN</i>	32
Chile	32
Croatia	32
Iran, Islamic Rep. of	32
Czech Republic	32
Norway	31
Germany	31
<b>International average</b>	<b>31</b>
<i>Northern Ireland-GBR</i>	31
Malta	30
<i>England-GBR</i>	30
Denmark	29
Saudi Arabia	29
Lithuania	28
Qatar	28
Austria	27 ▼
Turkey	26 ▼
Australia	26 ▼
Japan	26 ▼
Oman	26 ▼
Armenia	25 ▼
Kuwait	25 ▼
Netherlands	25 ▼
Hungary	25 ▼
New Zealand	25 ▼
Thailand	24 ▼
<i>Belgium (Flemish)-BEL</i>	24 ▼
Sweden	22 ▼
Georgia	20 ▼
Tunisia	15 ▼
Yemen	14 ▼

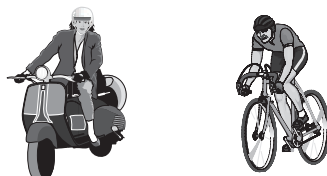
**Benchmarking education system**

<i>Dubai-UAE</i>	35 ▲
<i>Florida-USA</i>	33
<i>Abu Dhabi-UAE</i>	32
<i>North Carolina-USA</i>	32
<i>Ontario-CAN</i>	30
<i>Alberta-CAN</i>	27
<i>Quebec-CAN</i>	22 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Reasoning

Item label: Better way to travel around town



The pictures above show two ways of traveling around town.

A. Which way of traveling is better for the environment?

(Check one box.)

- Bicycle
- Motorbike

B. Explain your answer.

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	83 ▲
Croatia	78 ▲
Portugal	75 ▲
Slovenia	73 ▲
Finland	70 ▲
Italy	70 ▲
Sweden	68 ▲
Hungary	68 ▲
Russian Federation	67 ▲
Chinese Taipei-CHN	67 ▲
Spain	64 ▲
Czech Republic	64 ▲
Chile	63 ▲
Serbia	62 ▲
Germany	62 ▲
Iran, Islamic Rep. of	61 ▲
Slovak Republic	60 ▲
Austria	60 ▲
Singapore	54 ▲
Poland	54 ▲
Netherlands	53 ▲
Belgium (Flemish)-BEL	53 ▲
Romania	51
Lithuania	50
Norway	49
International average	48
England-GBR	47
Hong Kong-CHN	45
Japan	45
Denmark	44
United States	43 ▼
Northern Ireland-GBR	43 ▼
New Zealand	42 ▼
Australia	42 ▼
Ireland	41 ▼
Kazakhstan	40 ▼
Bahrain	39 ▼
Turkey	38 ▼
Thailand	36 ▼
Tunisia	35 ▼
United Arab Emirates	31 ▼
Malta	30 ▼
Qatar	29 ▼
Armenia	29 ▼
Saudi Arabia	28 ▼
Georgia	28 ▼
Morocco	24 ▼
Kuwait	20 ▼
Oman	18 ▼
Azerbaijan	12 ▼
Yemen	4 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	54 ▲
Ontario-CAN	51
Florida-USA	46
Quebec-CAN	45
Dubai-UAE	40 ▼
North Carolina-USA	36 ▼
Abu Dhabi-UAE	31 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S041039

### SCORING

#### Correct Response

- Bicycle with an explanation that relates to air or noise pollution. (If the explanation includes inaccurate information such as destroying the ozone layer, still credit the response).

Examples:

It does not produce fumes like a motorbike does.

A motorbike gives out fumes which go up into the air and pollute it. Whereas a bike does not.

The motorbike gives off fumes which destroy the ozone layer and so the bicycle is better for the environment.

#### Incorrect Response

- Bicycle with a general explanation.

Example: My answer is a bicycle because it does not use gas.

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

Examples:

A bicycle because it gives you exercise.

Item label: Better way to travel around town (continued)

S041039:

## Student Responses

### Correct Response:

A. Which way of traveling is better for the environment?

(Check one box.)

Bicycle

Motorbike

B. Explain your answer.

Because the motorcycle  
send oil up to the atmosphere  
and the ozone layer.

### Incorrect Response:

A. Which way of traveling is better for the environment?

(Check one box.)

Bicycle

Motorbike

B. Explain your answer.

A bicycle is better because  
you aren't using gas or  
stuff that comes from the  
earth. On a bicycle you  
just use your muscles.

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying

Item label: Group of animals contains reptiles

Which group of animals contains ONLY reptiles?

A. lizard, frog, snake

B. turtle, lizard, crocodile

C. octopus, snail, turtle

D. crab, earthworm, snake

Item Number: S041163

Correct Response:	<b>B</b>
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### Overall Percent Correct

Education system	Percent correct
Chinese Taipei-CHN	70 ▲
Lithuania	56 ▲
Singapore	56 ▲
<b>United States</b>	<b>55 ▲</b>
Australia	53 ▲
Oman	52 ▲
Slovenia	51 ▲
Ireland	51 ▲
Slovak Republic	50 ▲
Bahrain	49 ▲
Czech Republic	48 ▲
Thailand	48 ▲
Saudi Arabia	48 ▲
Iran, Islamic Rep. of	47 ▲
Germany	47 ▲
Northern Ireland-GBR	47 ▲
Hong Kong-CHN	46 ▲
England-GBR	46 ▲
Kuwait	45 ▲
Italy	45 ▲
Russian Federation	45 ▲
Belgium (Flemish)-BEL	45 ▲
New Zealand	44 ▲
United Arab Emirates	44 ▲
Netherlands	44
Chile	44
Austria	41
Qatar	40
Azerbaijan	40
<b>International average</b>	<b>40</b>
Spain	39
Romania	36
Morocco	36 ▼
Hungary	35 ▼
Kazakhstan	34 ▼
Poland	33 ▼
Malta	30 ▼
Yemen	30 ▼
Norway	29 ▼
Croatia	28 ▼
Portugal	27 ▼
Armenia	27 ▼
Sweden	25 ▼
Korea, Rep. of	25 ▼
Tunisia	25 ▼
Georgia	24 ▼
Denmark	23 ▼
Finland	21 ▼
Turkey	20 ▼
Serbia	18 ▼
Japan	14 ▼

### Benchmarking education system

Florida-USA	56 ▲
Quebec-CAN	56 ▲
Ontario-CAN	53 ▲
North Carolina-USA	51 ▲
Alberta-CAN	45 ▲
Abu Dhabi-UAE	44 ▲
Dubai-UAE	38

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Applying

Item label: Migration of birds

How does migration increase the survival of birds?

## Overall Percent Correct

Education system	Percent correct
Austria	81 ▲
Croatia	73 ▲
Finland	72 ▲
Slovak Republic	70 ▲
Singapore	70 ▲
Russian Federation	67 ▲
Sweden	64 ▲
Czech Republic	63 ▲
Slovenia	56 ▲
Hungary	55 ▲
Italy	52 ▲
Kazakhstan	51 ▲
Serbia	47 ▲
<b>United States</b>	<b>47 ▲</b>
Portugal	47 ▲
Romania	46 ▲
Turkey	45 ▲
Denmark	45 ▲
Lithuania	45 ▲
Armenia	41
Korea, Rep. of	40
Japan	38
<b>International average</b>	<b>37</b>
Poland	36
<i>Northern Ireland-GBR</i>	35
Bahrain	35
Iran, Islamic Rep. of	35
Azerbaijan	33 ▼
Georgia	33
Saudi Arabia	33
Ireland	31 ▼
Norway	31 ▼
<i>Chinese Taipei-CHN</i>	27 ▼
Thailand	27 ▼
Germany	24 ▼
Netherlands	24 ▼
New Zealand	23 ▼
Oman	19 ▼
<i>England-GBR</i>	19 ▼
Chile	19 ▼
<i>Belgium (Flemish)-BEL</i>	19 ▼
United Arab Emirates	19 ▼
Australia	19 ▼
Spain	18 ▼
Qatar	18 ▼
Morocco	17 ▼
Tunisia	16 ▼
Kuwait	12 ▼
<i>Hong Kong-CHN</i>	9 ▼
Malta	8 ▼
Yemen	3 ▼

Item Number: S041174

## SCORING

## Correct Response

- Refers to finding food and/or reproduction.

Examples:

Move from one region to another for feeding or breeding.

Some of the birds find food or a place to build their nest.

- Refers to moving to a warmer place without mention of food or reproduction.

Examples:

Birds living in a country with winter will die in the cold. They will migrate to a place where it is summer or spring.

It provides warm weather for the birds.

## Incorrect Response

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

## Benchmarking education system

<i>North Carolina-USA</i>	43 ▲
<i>Ontario-CAN</i>	42 ▲
<i>Florida-USA</i>	42
<i>Alberta-CAN</i>	40
<i>Quebec-CAN</i>	37
<i>Dubai-UAE</i>	19 ▼
<i>Abu Dhabi-UAE</i>	15 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Migration of birds (continued)

S041174:

## Student Responses

### Correct Response:

It increases the survival of birds because when they get too cold they can die but if they migrate they will stay warm and live longer.

### Incorrect Response:

The more they migrate the healthier they get.

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Knowing

Item label: What plants use energy for

Plants use energy directly from the Sun.  
What do they use the energy from the Sun for?

A. to make food  
B. to disperse seeds  
C. to fertilize the soil  
D. to prevent insect damage

Item Number: S041178

Correct Response:	A
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### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	93 ▲
Singapore	88 ▲
Hong Kong-CHN	87 ▲
Chinese Taipei-CHN	85 ▲
Japan	85 ▲
Saudi Arabia	79 ▲
Bahrain	78 ▲
Spain	75 ▲
Turkey	73 ▲
Thailand	72 ▲
Finland	71 ▲
Iran, Islamic Rep. of	71 ▲
Czech Republic	70 ▲
Serbia	69 ▲
Hungary	68 ▲
Oman	68 ▲
Croatia	68 ▲
Kuwait	67 ▲
United Arab Emirates	66 ▲
Italy	63 ▲
Russian Federation	61 ▲
<b>United States</b>	<b>60 ▲</b>
Qatar	56
Romania	55
<b>International average</b>	<b>51</b>
Lithuania	49
Portugal	48
England-GBR	46 ▼
Kazakhstan	45 ▼
Chile	44 ▼
Azerbaijan	44 ▼
Netherlands	42 ▼
Slovenia	42 ▼
Belgium (Flemish)-BEL	40 ▼
Malta	35 ▼
Slovak Republic	35 ▼
Armenia	34 ▼
Georgia	32 ▼
Poland	31 ▼
Ireland	30 ▼
Germany	30 ▼
New Zealand	29 ▼
Australia	29 ▼
Northern Ireland-GBR	29 ▼
Yemen	28 ▼
Austria	28 ▼
Morocco	23 ▼
Tunisia	21 ▼
Sweden	14 ▼
Norway	9 ▼
Denmark	8 ▼

### Benchmarking education system

Dubai-UAE	70 ▲
Florida-USA	64 ▲
Ontario-CAN	59 ▲
Abu Dhabi-UAE	58 ▲
North Carolina-USA	46
Alberta-CAN	42 ▼
Quebec-CAN	24 ▼

▲ Percent higher than International average  
▼ Percent lower than International average



Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Applying

Item label: Correct predator-prey relationship

The diagram below shows a food chain.

```

    graph LR
      A[green algae] --> B[krill]
      B --> C[fish]
      C --> D[seal]
      D --> E[killer whale]
    
```

green algae    krill    fish    seal    killer whale

Which predator-prey relationship is correct?

- A. fish (predator)-seal (prey)
- B. green algae (predator)-krill (prey)
- C. fish (predator)-krill (prey)
- D. seal (predator)-killer whale (prey)

Item Number: S041180

<b>Correct Response:</b>	<b>C</b>
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**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	87 ▲
Russian Federation	83 ▲
Czech Republic	81 ▲
Japan	77 ▲
Hong Kong-CHN	75 ▲
Finland	75 ▲
Chinese Taipei-CHN	74 ▲
Italy	73 ▲
Germany	72 ▲
Lithuania	71 ▲
Netherlands	71 ▲
Hungary	69 ▲
Thailand	68 ▲
Croatia	67 ▲
Portugal	67 ▲
Serbia	66 ▲
<b>United States</b>	<b>66 ▲</b>
Slovak Republic	66 ▲
Austria	66 ▲
Poland	66 ▲
Singapore	64 ▲
Sweden	62 ▲
England-GBR	62 ▲
Belgium (Flemish)-BEL	61
Romania	61
Spain	60
Slovenia	60
Chile	60
<b>International average</b>	<b>57</b>
Australia	57
Ireland	53
Northern Ireland-GBR	52 ▼
New Zealand	51 ▼
Turkey	50 ▼
Denmark	49 ▼
Bahrain	48 ▼
Kazakhstan	48 ▼
Saudi Arabia	47 ▼
Azerbaijan	42 ▼
Tunisia	42 ▼
United Arab Emirates	41 ▼
Oman	39 ▼
Iran, Islamic Rep. of	38 ▼
Malta	38 ▼
Qatar	38 ▼
Georgia	37 ▼
Armenia	34 ▼
Kuwait	32 ▼
Norway	31 ▼
Morocco	27 ▼
Yemen	26 ▼
<b>Benchmarking education system</b>	
North Carolina-USA	70 ▲
Florida-USA	68 ▲
Quebec-CAN	65 ▲
Alberta-CAN	63 ▲
Ontario-CAN	58
Dubai-UAE	47 ▼
Abu Dhabi-UAE	41 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Human Health	Applying

Item label: Influenza passing between people

How can influenza be passed from person to person?

### Overall Percent Correct

Education system	Percent correct
Sweden	84 ▲
Lithuania	81 ▲
Japan	78 ▲
Slovak Republic	76 ▲
Northern Ireland-GBR	75 ▲
Russian Federation	75 ▲
Croatia	74 ▲
Finland	73 ▲
Czech Republic	73 ▲
England-GBR	73 ▲
Hungary	73 ▲
Serbia	72 ▲
Netherlands	72 ▲
Belgium (Flemish)-BEL	70 ▲
Austria	69 ▲
Kazakhstan	69 ▲
Denmark	69 ▲
New Zealand	68 ▲
Germany	67 ▲
Georgia	67 ▲
Chinese Taipei-CHN	67 ▲
Korea, Rep. of	67 ▲
Romania	66 ▲
Thailand	64 ▲
Spain	60
Slovenia	60
Norway	60
Hong Kong-CHN	60
Azerbaijan	59
<b>International average</b>	<b>58</b>
Singapore	58
Portugal	57
Iran, Islamic Rep. of	55
Armenia	55
Chile	54 ▼
<b>United States</b>	<b>54 ▼</b>
Turkey	54 ▼
Ireland	52 ▼
Poland	51 ▼
Bahrain	48 ▼
Australia	47 ▼
Saudi Arabia	40 ▼
Italy	39 ▼
United Arab Emirates	38 ▼
Qatar	38 ▼
Malta	35 ▼
Oman	33 ▼
Tunisia	32 ▼
Morocco	30 ▼
Kuwait	26 ▼
Yemen	5 ▼
<b>Benchmarking education system</b>	
Quebec-CAN	72 ▲
Alberta-CAN	53 ▼
Florida-USA	52 ▼
Ontario-CAN	48 ▼
North Carolina-USA	48 ▼
Dubai-UAE	40 ▼
Abu Dhabi-UAE	34 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S041181

### SCORING

#### Correct Response

- Mentions coughing or sneezing.

Example: If you sneeze on your friend the germs can be passed on.

- Mentions touching the same object, using the same utensils, or having physical contact with a person who has influenza.

Example: Influenza can be passed by sharing food and drinks.

- Other correct

Example: It is passed in the air.

#### Incorrect Response

- Mentions being near someone with influenza but does not mention coughing, sneezing, or any direct contact.

Example: It can be passed by going near to someone with influenza.

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

Item label: Influenza passing between people (continued)

S041181:

## Student Responses

### Correct Response:

If the person who has influenza coughs on someone, that person will get influenza.

### Incorrect Response:

By going near other people and passing it on.

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Human Health	Applying

Item label: One thing to avoid flu

Marcie is playing a board game with a friend who has the flu.

Write down one thing Marcie can do to avoid catching the flu from her friend.

Item Number: S041182

### SCORING

#### Correct Response

- States one acceptable reason.

Examples:

Marcie can wash her hands.

Marcie can cover her nose and mouth with a mask.

Marcie can tell her friend to wear a mask.

Marcie can wear gloves.

Marcie should not touch her face.

#### Incorrect Response

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

Examples:

Don't sit near her.

Get a flu shot.

### Overall Percent Correct

Education system	Percent correct
Japan	93 ▲
Korea, Rep. of	78 ▲
Russian Federation	77 ▲
Chinese Taipei-CHN	75 ▲
Singapore	67 ▲
Kazakhstan	66 ▲
Finland	61 ▲
<b>United States</b>	<b>61 ▲</b>
Portugal	57 ▲
Hong Kong-CHN	55 ▲
Ireland	54 ▲
Lithuania	53 ▲
Chile	53 ▲
Georgia	49 ▲
Norway	48 ▲
Iran, Islamic Rep. of	48 ▲
Thailand	47
England-GBR	46
Australia	46 ▲
Denmark	44
Croatia	44
Spain	43
Sweden	43
Serbia	42
<b>International average</b>	<b>42</b>
Netherlands	41
New Zealand	40
Northern Ireland-GBR	40
Hungary	39
Romania	38
Slovenia	38
Germany	37 ▼
Azerbaijan	36
Turkey	35 ▼
Slovak Republic	35 ▼
Austria	35 ▼
Armenia	35 ▼
Czech Republic	33 ▼
Poland	31 ▼
Saudi Arabia	29 ▼
Bahrain	27 ▼
United Arab Emirates	25 ▼
Belgium (Flemish)-BEL	24 ▼
Italy	23 ▼
Oman	20 ▼
Malta	19 ▼
Tunisia	18 ▼
Qatar	17 ▼
Kuwait	9 ▼
Yemen	3 ▼
Morocco	# ▼

### Benchmarking education system

North Carolina-USA	58 ▲
Florida-USA	57 ▲
Quebec-CAN	55 ▲
Ontario-CAN	52 ▲
Alberta-CAN	52 ▲
Dubai-UAE	30 ▼
Abu Dhabi-UAE	22 ▼

▲ Percent higher than International average

▼ Percent lower than International average

# Rounds to zero

Item label: One thing to avoid flu (continued)

S041182:

## Student Responses

### Correct Response:

She can tell her friends  
to cover their mouth when  
the cough.

### Incorrect Response:

dont touch you

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Knowing

Item label: Flowering plant parts

The diagram shows a flowering plant. Four of its parts are numbered.

In the table below, write the name of each part, and state its function.

Part Number	Name of Part	Function of Part
1		
2		
3		
4		

Item Number: S041224

**SCORING**

**Correct Response**

- Identifies 4 parts of the plant and states a correct function for each.
  - Flower (bud). Example: It produces seeds.
  - Seeds. Example: They reproduce the plant when the seed germinates.
  - Petals. Example: They attract pollinators.
  - Stem (stalk). Example: It transports water and food.
  - Leaf. Example: It makes food for the plant.
  - Root. Example: It transports water into the plant.

- Identifies 4 parts of the plant and states 3 correct functions.

**Partially Correct Response**

- Identifies 4 parts and 1 or 2 correct functions OR 3 parts and 1 or 2 or 3 correct functions OR 2 parts and 1 or 2 functions.

**Incorrect Response**

- Identifies 4 parts, but no correct functions
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

**Overall Percent Correct**

Education system	Percent correct
Singapore	80 ▲
Korea, Rep. of	42 ▲
Thailand	40 ▲
Czech Republic	39 ▲
Bahrain	37 ▲
Italy	36 ▲
Romania	35 ▲
Hungary	34 ▲
Croatia	33 ▲
Finland	32 ▲
Portugal	31 ▲
Iran, Islamic Rep. of	28 ▲
Kazakhstan	27 ▲
Chinese Taipei-CHN	26 ▲
Austria	25 ▲
Slovak Republic	25 ▲
<b>United States</b>	<b>24 ▲</b>
Serbia	23
United Arab Emirates	22
Lithuania	21
England-GBR	21
<b>International average</b>	<b>21</b>
Russian Federation	20
Japan	20
Oman	19
Sweden	18
Kuwait	18
Saudi Arabia	16
Hong Kong-CHN	16 ▼
Spain	16 ▼
Slovenia	15 ▼
Denmark	15 ▼
Azerbaijan	15 ▼
Qatar	13 ▼
Chile	13 ▼
Poland	13 ▼
Morocco	12 ▼
Turkey	11 ▼
Ireland	10 ▼
Georgia	10 ▼
Germany	10 ▼
Australia	10 ▼
Armenia	10 ▼
Northern Ireland-GBR	9 ▼
Netherlands	8 ▼
Belgium (Flemish)-BEL	6 ▼
Malta	6 ▼
New Zealand	6 ▼
Norway	4 ▼
Tunisia	2 ▼
Yemen	1 ▼

**Benchmarking education system**

Dubai-UAE	31 ▲
Florida-USA	24
Ontario-CAN	22
Alberta-CAN	21
Abu Dhabi-UAE	17
North Carolina-USA	13 ▼
Quebec-CAN	8 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

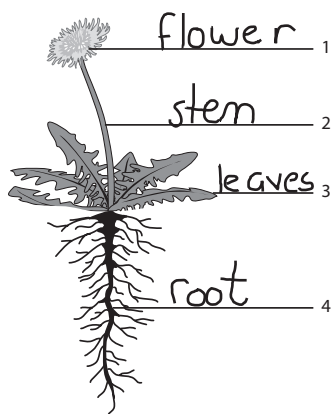
## Item label: Flowering plant parts (continued)

S041224:

## Student Responses

## Correct Response:

The diagram shows a flowering plant. Four of its parts are numbered.



In the table below, write the name of each part, and state its function.

Part Number	Name of Part	Function of Part
1	flower	The flowers job is to spread seeds
2	stem	The stems job is to carry nutrients to the flower.
3	leaves	The leaves job is to feed the plant.
4	roots	The roots job is to suck up nutrients from the ground.

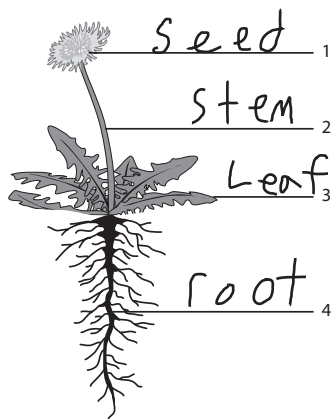
Item label: Flowering plant parts (continued)

S041224:

## Student Responses

### Partially Correct Response:

The diagram shows a flowering plant. Four of its parts are numbered.



In the table below, write the name of each part, and state its function.

Part Number	Name of Part	Function of Part
1	Seed	to spread
2	stem	to hold the flower
3	Leaf	for nutreins
4	root	for growth



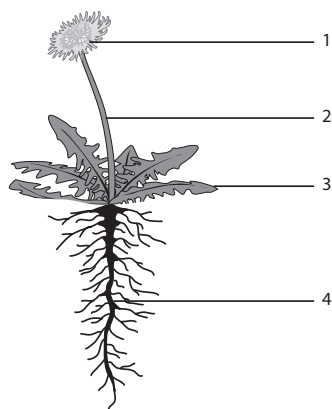
## Item label: Flowering plant parts (continued)

S041224:

## Student Responses

## Incorrect Response:

The diagram shows a flowering plant. Four of its parts are numbered.



In the table below, write the name of each part, and state its function.

Part Number	Name of Part	Function of Part
1	Seeds	Start out growing
2	Stem	Part that come from roots.
3	Leaves	Something that grows with the flower.
4	roots	Part that is in the soil

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Applying

Item label: Hedgehog rolling into ball

A hedgehog is a small spiny animal. When it is frightened it rolls into a ball.



How does this behavior help the hedgehog?

- A. The hedgehog can roll away quickly.
- B. The hedgehog looks larger rolled up.
- C. The hedgehog is harder to see in a ball.
- D. The hedgehog's soft body parts are covered.

Item Number: S051032

<b>Correct Response:</b>	<b>D</b>
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**Overall Percent Correct**

Education system	Percent correct
Russian Federation	76 ▲
Denmark	74 ▲
Poland	73 ▲
Slovenia	73 ▲
Finland	72 ▲
Czech Republic	71 ▲
Hungary	69 ▲
Spain	68 ▲
Germany	66 ▲
Croatia	66 ▲
Slovak Republic	65 ▲
Serbia	65 ▲
Lithuania	64 ▲
Austria	61 ▲
Kazakhstan	59 ▲
Northern Ireland-GBR	58 ▲
Korea, Rep. of	58 ▲
England-GBR	58 ▲
Japan	57 ▲
Turkey	56 ▲
Azerbaijan	56 ▲
Netherlands	54 ▲
Sweden	54
Ireland	51
New Zealand	51
Hong Kong-CHN	51
<b>United States</b>	<b>50</b>
<b>International average</b>	<b>50</b>
Singapore	50
Portugal	50
Australia	49
Italy	49
Chinese Taipei-CHN	48
Romania	47
Iran, Islamic Rep. of	45
Georgia	45 ▼
Belgium (Flemish)-BEL	43 ▼
Thailand	43 ▼
Norway	43 ▼
Malta	37 ▼
Chile	34 ▼
Armenia	34 ▼
Bahrain	30 ▼
Saudi Arabia	30 ▼
Qatar	27 ▼
United Arab Emirates	27 ▼
Morocco	24 ▼
Tunisia	23 ▼
Yemen	22 ▼
Kuwait	19 ▼
Oman	18 ▼

**Benchmarking education system**

Quebec-CAN	59 ▲
Alberta-CAN	54
Florida-USA	53
North Carolina-USA	49
Ontario-CAN	47
Dubai-UAE	35 ▼
Abu Dhabi-UAE	26 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Interactions with the Environment	Applying

Item label: Why desert animals active at night

Why are many desert animals more active at night?

- A. It is drier at night.
- B. It is cooler at night.
- C. There is less danger at night.
- D. There is less wind at night.

Item Number: S051033

**Correct Response:**

**B**

### Overall Percent Correct

Education system	Percent correct
Chinese Taipei-CHN	71 ▲
<b>United States</b>	<b>68 ▲</b>
Netherlands	67 ▲
Portugal	64 ▲
Romania	64 ▲
Sweden	63 ▲
Hong Kong-CHN	63 ▲
Finland	62 ▲
Russian Federation	61 ▲
Germany	61 ▲
Singapore	60 ▲
Kazakhstan	59 ▲
Australia	59 ▲
Ireland	59 ▲
Hungary	58 ▲
England-GBR	56 ▲
Austria	55 ▲
Northern Ireland-GBR	55 ▲
Slovak Republic	53 ▲
Italy	53
Korea, Rep. of	53
Malta	52
Armenia	52
Spain	51
New Zealand	50
Bahrain	50
Georgia	49
Chile	49
<b>International average</b>	<b>49</b>
Azerbaijan	48
Poland	47
Lithuania	46
United Arab Emirates	45 ▼
Qatar	43 ▼
Belgium (Flemish)-BEL	42 ▼
Denmark	40 ▼
Oman	39 ▼
Czech Republic	38 ▼
Japan	38 ▼
Saudi Arabia	37 ▼
Croatia	36 ▼
Morocco	35 ▼
Norway	34 ▼
Slovenia	32 ▼
Kuwait	32 ▼
Turkey	32 ▼
Iran, Islamic Rep. of	32 ▼
Serbia	31 ▼
Yemen	31 ▼
Thailand	30 ▼
Tunisia	30 ▼

### Benchmarking education system




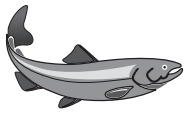

Florida-USA	76 ▲
North Carolina-USA	68 ▲
Quebec-CAN	63 ▲
Ontario-CAN	60 ▲
Alberta-CAN	59 ▲
Dubai-UAE	51
Abu Dhabi-UAE	42 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Applying

Item label: Animals with backbones- DERIVED

Which animals shown below have a backbone?  
 Fill in one oval for **each** animal. One has been done for you.

Animal	Has a Backbone	
	Yes	No
 heron	<input checked="" type="radio"/>	<input type="radio"/>
 spider	<input type="radio"/>	<input type="radio"/>
 crab	<input type="radio"/>	<input type="radio"/>
 fish	<input type="radio"/>	<input type="radio"/>
 lion	<input type="radio"/>	<input type="radio"/>

Item Number: S051049Z

**SCORING**

**Correct Response**

- Fill in the ovals in the order: B, B, A, A

**Incorrect Response**

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

**Overall Percent Correct**

Education system	Percent correct
Japan	65 ▲
Italy	59 ▲
Russian Federation	56 ▲
Czech Republic	55 ▲
Croatia	55 ▲
Sweden	53 ▲
Hungary	53 ▲
Spain	51 ▲
Slovak Republic	50 ▲
Finland	49 ▲
Bahrain	49 ▲
Romania	49 ▲
Chile	48 ▲
Germany	47 ▲
Saudi Arabia	47 ▲
Austria	45
Australia	45 ▲
Norway	43
Korea, Rep. of	43
Thailand	42
Poland	42
Slovenia	42
Kazakhstan	41
Portugal	41
<b>International average</b>	<b>41</b>
Iran, Islamic Rep. of	41
Serbia	40
Georgia	40
Denmark	39
<b>United States</b>	<b>39</b>
Hong Kong-CHN	38
New Zealand	38
England-GBR	37
Lithuania	37
Malta	37
Singapore	37 ▼
Ireland	37 ▼
Northern Ireland-GBR	36
Azerbaijan	35 ▼
Armenia	35 ▼
Oman	33 ▼
Turkey	32 ▼
United Arab Emirates	32 ▼
Chinese Taipei-CHN	31 ▼
Netherlands	31 ▼
Kuwait	30 ▼
Belgium (Flemish)-BEL	28 ▼
Morocco	28 ▼
Qatar	24 ▼
Tunisia	22 ▼
Yemen	17 ▼
<b>Benchmarking education system</b>	
Quebec-CAN	47 ▲
Alberta-CAN	43
Ontario-CAN	38
Florida-USA	37
Abu Dhabi-UAE	35 ▼
North Carolina-USA	31 ▼
Dubai-UAE	30 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Characteristics and Life Processes of Living Things	Knowing

Item label: Write body part beside function

The table shows three functions carried out by parts of the human body.

Write the name of the body part beside its function. The first one has been done for you.

Function	Body Part
Supports the body	Skeleton
Pumps blood through the body	
Used for thinking	

Item Number: S051057

### SCORING

#### Correct Response

- Completes the table as shown.

Function	Body Part
Supports the body	Skeleton
Pumps blood through the body	Heart
Used for thinking	Brain

#### Incorrect Response

- Identifies the heart only.
- Identifies the brain only.
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task), including the following response: Mind

### Overall Percent Correct

Education system	Percent correct
Finland	91 ▲
Sweden	83 ▲
Czech Republic	81 ▲
England-GBR	80 ▲
Norway	80 ▲
Northern Ireland-GBR	78 ▲
Spain	75 ▲
Hungary	74 ▲
Slovenia	73 ▲
Slovak Republic	73 ▲
Denmark	72 ▲
Ireland	70 ▲
New Zealand	70 ▲
Austria	69 ▲
Australia	69 ▲
Portugal	69 ▲
Germany	68 ▲
Turkey	67 ▲
Singapore	66 ▲
<b>United States</b>	<b>65 ▲</b>
Croatia	64 ▲
Romania	64 ▲
Netherlands	60 ▲
Russian Federation	58 ▲
Italy	56 ▲
Belgium (Flemish)-BEL	54 ▲
Hong Kong-CHN	54
Chile	50
Malta	50
<b>International average</b>	<b>50</b>
Serbia	49
Azerbaijan	46
Poland	45 ▼
Kazakhstan	37 ▼
United Arab Emirates	37 ▼
Qatar	35 ▼
Lithuania	35 ▼
Georgia	29 ▼
Iran, Islamic Rep. of	29 ▼
Japan	26 ▼
Thailand	26 ▼
Bahrain	24 ▼
Korea, Rep. of	23 ▼
Armenia	21 ▼
Chinese Taipei-CHN	15 ▼
Tunisia	10 ▼
Kuwait	9 ▼
Oman	8 ▼
Saudi Arabia	7 ▼
Morocco	4 ▼
Yemen	2 ▼

### Benchmarking education system

Ontario-CAN	70 ▲
Alberta-CAN	70 ▲
Florida-USA	66 ▲
Quebec-CAN	63 ▲
North Carolina-USA	62 ▲
Dubai-UAE	54 ▲
Abu Dhabi-UAE	30 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Write body parts beside function (continued)

S051057:

## Student Responses

### Correct Response:

Function	Body Part
Supports the body	Skeleton
Pumps blood through the body	Heart
Used for thinking	Brain

### Incorrect Response:

Function	Body Part
Supports the body	Skeleton
Pumps blood through the body	Lungs
Used for thinking	brain

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Human Health	Knowing

Item label: Calcium important for growth

Harry grows two centimeters in one month.  
Why is eating food that contains calcium important for Harry's growth?

Item Number: S051173

### SCORING

#### Correct Response

- Refers to calcium being needed to make (strong) bones.

Examples:

He needs the calcium for his bones.

His bones are growing and he needs calcium to make them.

#### Incorrect Response

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

### Overall Percent Correct

Education system	Percent correct
Japan	49 ▲
Denmark	46 ▲
Finland	42 ▲
Kazakhstan	40 ▲
England-GBR	38 ▲
Czech Republic	37 ▲
Russian Federation	35 ▲
Spain	35 ▲
Portugal	31 ▲
Northern Ireland-GBR	30 ▲
Lithuania	30 ▲
Slovak Republic	28 ▲
Chile	28 ▲
Ireland	27 ▲
Hong Kong-CHN	27 ▲
Singapore	25 ▲
Poland	24
Italy	24
Romania	22
Korea, Rep. of	21
Sweden	21
Australia	21
New Zealand	21
<b>International ave</b>	<b>20</b>
Hungary	19
Thailand	19
<b>United States</b>	<b>18</b>
Germany	18
Chinese Taipei-CHN	17
Azerbaijan	16 ▼
Saudi Arabia	15 ▼
Austria	14 ▼
Armenia	13 ▼
Bahrain	13 ▼
Turkey	13 ▼
Belgium (Flemish)-BEL	12 ▼
Norway	11 ▼
United Arab Emirates	11 ▼
Serbia	11 ▼
Croatia	10 ▼
Slovenia	10 ▼
Malta	10 ▼
Qatar	9 ▼
Netherlands	9 ▼
Iran, Islamic Rep. of	8 ▼
Georgia	8 ▼
Oman	7 ▼
Tunisia	5 ▼
Morocco	5 ▼
Kuwait	4 ▼
Yemen	2 ▼

### Benchmarking education system

Alberta-CAN	32 ▲
Ontario-CAN	29 ▲
North Carolina-USA	22
Quebec-CAN	21
Florida-USA	16
Dubai-UAE	11 ▼
Abu Dhabi-UAE	11 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Calcium important for growth (continued)

S051173:

## Student Responses

### Correct Response:

Calcium makes your bones stronger

### Incorrect Response:

because it is healthy  
for you



Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Reasoning

Item label: Maria's experiment with salt/water

Maria designed an experiment using salt and water. The results of her experiment are shown in the table.

Amount of Salt Dissolved	Water Volume	Water Temperature	Was Mixture Stirred?
15 grams	50 ml	25° C	Yes
30 grams	100 ml	25° C	Yes
45 grams	150 ml	25° C	Yes
60 grams	200 ml	25° C	Yes

What was Maria studying in her experiment?

- A. How much salt will dissolve in different volumes of water.
- B. How much salt will dissolve at different temperatures.
- C. If stirring increases how fast salt will dissolve.
- D. If stirring decreases how fast salt will dissolve.

Item Number: S031068

**Correct Response:**

**A**

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	84 ▲
Singapore	75 ▲
Japan	68 ▲
Hong Kong-CHN	64 ▲
<b>United States</b>	<b>64 ▲</b>
England-GBR	63 ▲
Chinese Taipei-CHN	63 ▲
Finland	59 ▲
Denmark	59 ▲
Czech Republic	59 ▲
Russian Federation	58 ▲
Australia	58 ▲
Italy	56 ▲
Germany	55 ▲
Northern Ireland-GBR	55 ▲
Hungary	55 ▲
Croatia	54 ▲
Serbia	54
Austria	54 ▲
Belgium (Flemish)-BEL	53
Slovak Republic	53
Lithuania	52
Ireland	52
Sweden	52
Portugal	52
Slovenia	52
New Zealand	51
Turkey	50
<b>International average</b>	<b>49</b>
Netherlands	48
Romania	48
Malta	47
Norway	46
Chile	45 ▼
Bahrain	45
Azerbaijan	44
United Arab Emirates	44 ▼
Spain	44 ▼
Kazakhstan	43 ▼
Poland	41 ▼
Oman	39 ▼
Thailand	38 ▼
Qatar	37 ▼
Saudi Arabia	36 ▼
Iran, Islamic Rep. of	36 ▼
Kuwait	33 ▼
Morocco	32 ▼
Georgia	27 ▼
Armenia	26 ▼
Yemen	20 ▼
Tunisia	16 ▼

### Benchmarking education system

Florida-USA	72 ▲
North Carolina-USA	71 ▲
Alberta-CAN	59 ▲
Ontario-CAN	59 ▲
Dubai-UAE	52
Quebec-CAN	49
Abu Dhabi-UAE	41 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Reasoning

Item label: Two carts holding magnets



The figure shows two carts, each holding a magnet. The carts are moved close together and then let go.

Describe what will happen to the carts.

(You may draw a picture to help explain your answer.)

### Overall Percent Correct

Education system	Percent correct
Singapore	90 ▲
Korea, Rep. of	88 ▲
Japan	87 ▲
Chinese Taipei-CHN	77 ▲
<b>United States</b>	<b>58 ▲</b>
England-GBR	53 ▲
Iran, Islamic Rep. of	51 ▲
Romania	50 ▲
Hong Kong-CHN	49 ▲
Russian Federation	48 ▲
Slovenia	48 ▲
Austria	48 ▲
Germany	43 ▲
Ireland	42 ▲
Denmark	42 ▲
Malta	40
Hungary	40
Kuwait	40
Finland	38
Slovak Republic	37
Portugal	37
<b>International average</b>	<b>36</b>
Sweden	36
Serbia	36
Thailand	36
Australia	35
Netherlands	34
New Zealand	33
Czech Republic	32
Bahrain	32
United Arab Emirates	31 ▼
Qatar	30 ▼
Kazakhstan	27 ▼
Northern Ireland-GBR	27 ▼
Saudi Arabia	27 ▼
Lithuania	27 ▼
Spain	26 ▼
Turkey	26 ▼
Azerbaijan	25 ▼
Chile	23 ▼
Georgia	23 ▼
Poland	22 ▼
Oman	22 ▼
Norway	21 ▼
Belgium (Flemish)-BEL	19 ▼
Italy	18 ▼
Croatia	17 ▼
Armenia	11 ▼
Yemen	2 ▼
Tunisia	2 ▼
Morocco	1 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	64 ▲
North Carolina-USA	55 ▲
Florida-USA	54 ▲
Ontario-CAN	50 ▲
Dubai-UAE	33 ▼
Quebec-CAN	32
Abu Dhabi-UAE	31

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S031076

### SCORING

#### Correct Response

- Refers to carts repelling, moving apart from each other, or NOT being attracted to each other (or similar). [May draw diagram to indicate this.]

Examples:

The magnets repel because two north poles pull apart.

They will push each other away.

The carts will spread apart.

The two carts will not stick together.

#### Incorrect Response

- Refers only to the two carts being attracted WITHOUT any mention of turning so N-S poles are attracted.

Example: They will stick together.

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

Item label: Two carts holding magnets (continued)

S031076:

## Student Responses

### Correct Response:

The carts will not stay together because the sides facing each other are negatives you need them like this;



### Incorrect Response:

The magnetic pull will pull the magnets together



Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Applying

Item label: Object in circuit for bulb to glow

The following picture shows a lightbulb connected to a battery in an electrical circuit. Which of the following objects connected to Points 1 and 2 will allow the bulb to glow?

A. iron nail  
 B. plastic spoon  
 C. rubber band  
 D. wooden stick

Item Number: S031077

<b>Correct Response:</b>	<b>A</b>
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**Overall Percent Correct**

Education system	Percent correct
Japan	94 ▲
Chinese Taipei-CHN	94 ▲
Singapore	94 ▲
Austria	89 ▲
Germany	88 ▲
Slovak Republic	87 ▲
Finland	86 ▲
<b>United States</b>	<b>84 ▲</b>
Hong Kong-CHN	84 ▲
England-GBR	84 ▲
Korea, Rep. of	83 ▲
Iran, Islamic Rep. of	82 ▲
Sweden	79 ▲
Portugal	79 ▲
Belgium (Flemish)-BEL	78 ▲
Czech Republic	77 ▲
Slovenia	76 ▲
Ireland	76 ▲
Serbia	76 ▲
Northern Ireland-GBR	75
Denmark	75
Malta	75
Romania	74
Poland	74
Lithuania	74
New Zealand	74
Australia	74
Hungary	73
Croatia	73
Russian Federation	72
<b>International average</b>	<b>71</b>
Spain	71
Oman	68
Thailand	68
Norway	67
Turkey	63 ▼
Kazakhstan	62 ▼
Italy	62 ▼
Netherlands	62 ▼
Qatar	61 ▼
United Arab Emirates	61 ▼
Armenia	60 ▼
Chile	59 ▼
Azerbaijan	57 ▼
Bahrain	57 ▼
Georgia	56 ▼
Saudi Arabia	53 ▼
Tunisia	46 ▼
Morocco	43 ▼
Yemen	36 ▼
Kuwait	34 ▼

**Benchmarking education system**

North Carolina-USA	91 ▲
Florida-USA	80 ▲
Alberta-CAN	78 ▲
Ontario-CAN	76 ▲
Quebec-CAN	71
Dubai-UAE	69
Abu Dhabi-UAE	58 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Knowing

Item label: Two uses of electricity-DERIVED

Name two things electricity can be used for in daily life.

Use 1:

Use 2:

Item Number: S031197Z

**SCORING**

Note: Each of the two responses are scored separately. However, if the two responses are essentially the same, the second response should be scored as "Incorrect Response".

**Correct Response**

- Refers to providing light.
- Refers to supplying heat.
- Refers to an electrical household appliance or device.
- Refers to transportation.
- Other correct

**Incorrect Response**

- Response too vague. [Connection to light, heat or other use not clear.]

Examples

It helps us.

To read and write.

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

**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	91 ▲
Finland	82 ▲
Northern Ireland-GBR	78 ▲
Sweden	77 ▲
Ireland	76 ▲
Thailand	75 ▲
England-GBR	75 ▲
Singapore	74 ▲
Belgium (Flemish)-BEL	72 ▲
Australia	71 ▲
Japan	71 ▲
Slovenia	70 ▲
Slovak Republic	70 ▲
Denmark	70 ▲
Lithuania	69 ▲
<b>United States</b>	<b>68 ▲</b>
Bahrain	68 ▲
Netherlands	67 ▲
Austria	66 ▲
Chinese Taipei-CHN	66 ▲
New Zealand	65 ▲
Italy	64 ▲
Hungary	64 ▲
Germany	63 ▲
Czech Republic	63 ▲
Norway	61
Poland	60
Saudi Arabia	58
Hong Kong-CHN	58
Portugal	57
<b>International average</b>	<b>57</b>
Russian Federation	56
Spain	56
Kazakhstan	54
Malta	52 ▼
United Arab Emirates	51 ▼
Iran, Islamic Rep. of	50 ▼
Croatia	48 ▼
Romania	44 ▼
Chile	44 ▼
Qatar	41 ▼
Azerbaijan	41 ▼
Oman	40 ▼
Georgia	39 ▼
Kuwait	37 ▼
Serbia	36 ▼
Tunisia	29 ▼
Armenia	26 ▼
Turkey	20 ▼
Yemen	12 ▼
Morocco	8 ▼
<b>Benchmarking education system</b>	
Florida-USA	70 ▲
Ontario-CAN	70 ▲
Alberta-CAN	69 ▲
North Carolina-USA	66 ▲
Quebec-CAN	59
Dubai-UAE	56
Abu Dhabi-UAE	50 ▼

▲ Percent higher than International average

▼ Percent lower than International average

Item label: Two uses of electricity (continued)

S031197Z:

## Student Responses

### Correct Response:

Use 1: It can help you when you need to cook.

Use 2: it can help you to turn on the light.

### Incorrect Response:

Use 1: excperiments

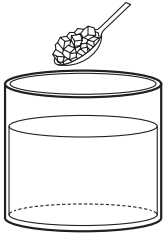
Use 2: light

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Applying

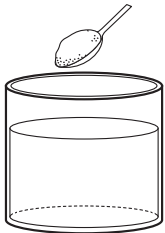
Item label: Coarse & fine salt added to water

Coarse salt and fine salt are added to water and then stirred as shown in the picture.

Coarse Salt



Fine Salt



A. Which statement is true?  
(Check one box.)

Coarse salt will dissolve faster.

Fine salt will dissolve faster.

They both will dissolve in the same amount of time.

B. Explain your answer.

Item Number: S031204

### SCORING

#### Correct Response

- FINE with an explanation based on smaller particles dissolving faster (or similar).

Examples:

The fine salt has the smallest size of crystals, so they will dissolve faster.

The coarse salt is in big blocks that do not dissolve very well.

The fine salt is already partly broken down.

#### Incorrect Response

- FINE with no explanation or an incorrect explanation. [May include a true statement that does not answer the question.]

Example: The fine salt is lighter.

- COARSE with or without explanation.
- BOTH with or without explanation.
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	79 ▲
Japan	60 ▲
Chinese Taipei-CHN	58 ▲
<b>United States</b>	<b>56 ▲</b>
Singapore	54 ▲
Slovenia	52 ▲
Serbia	52 ▲
Italy	51 ▲
Finland	50 ▲
Germany	47 ▲
Australia	47 ▲
Denmark	46 ▲
Turkey	45 ▲
England-GBR	45 ▲
Netherlands	44 ▲
Croatia	44 ▲
Sweden	44 ▲
Portugal	44 ▲
New Zealand	42 ▲
Austria	42 ▲
Chile	42 ▲
Slovak Republic	41
Kazakhstan	39
Belgium (Flemish)-BEL	38
Romania	38
Thailand	38
Ireland	38
Hong Kong-CHN	38
Lithuania	38
Czech Republic	37
<b>International average</b>	<b>37</b>
Hungary	37
Northern Ireland-GBR	35
Russian Federation	33
Poland	33
Saudi Arabia	30 ▼
Spain	28 ▼
Norway	26 ▼
Iran, Islamic Rep. of	24 ▼
Oman	23 ▼
Armenia	22 ▼
Qatar	22 ▼
Georgia	22 ▼
Bahrain	22 ▼
United Arab Emirates	21 ▼
Tunisia	20 ▼
Azerbaijan	19 ▼
Kuwait	17 ▼
Malta	12 ▼
Yemen	10 ▼
Morocco	5 ▼
<b>Benchmarking education system</b>	
North Carolina-USA	60 ▲
Ontario-CAN	59 ▲
Alberta-CAN	55 ▲
Florida-USA	51 ▲
Quebec-CAN	49 ▲
Dubai-UAE	30 ▼
Abu Dhabi-UAE	16 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Coarse & fine salt added to water (continued)

S031204:

## Student Responses

### Correct Response:

A. Which statement is true?

(Check one box.)

Coarse salt will dissolve faster.

Fine salt will dissolve faster.

They both will dissolve in the same amount of time.

B. Explain your answer. Because fine salt is smaller than coarse salt so fine will dissolve quicker.

### Incorrect Response:

A. Which statement is true?

(Check one box.)

Coarse salt will dissolve faster.

Fine salt will dissolve faster.

They both will dissolve in the same amount of time.

B. Explain your answer.

there both salt



Content Domain	Main Topic	Cognitive Domain
<b>PHYSICAL SCIENCE</b>	Sources and Effects of Energy	Applying

Item label: Metal spoon and wooden spoon

A metal spoon and a wooden spoon are used to stir a pot of hot soup. After a few minutes, the metal spoon feels hotter than the wooden spoon. What explains this?

A. Metal is always hotter than wood.  
 B. Metal conducts heat better than wood.  
 C. Metal conducts electricity better than wood.  
 D. Metal heats up the water better than the wood.

Item Number: S031273

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	96 ▲
Singapore	89 ▲
Japan	87 ▲
Hong Kong-CHN	86 ▲
Finland	82 ▲
England-GBR	72 ▲
<b>United States</b>	<b>70 ▲</b>
Serbia	68 ▲
Hungary	68 ▲
Sweden	66 ▲
Italy	65 ▲
Australia	65 ▲
Ireland	65 ▲
Northern Ireland-GBR	64 ▲
Russian Federation	63 ▲
Spain	63 ▲
Germany	62 ▲
Austria	61 ▲
Chinese Taipei-CHN	61 ▲
Slovenia	58
Denmark	57
<b>International average</b>	<b>56</b>
Poland	55
Portugal	54
Georgia	54
Romania	54
Thailand	53
Azerbaijan	52
Netherlands	51
Belgium (Flemish)-BEL	51 ▼
Turkey	50 ▼
Kazakhstan	49 ▼
Qatar	49 ▼
Chile	49 ▼
Lithuania	47 ▼
New Zealand	47 ▼
Tunisia	47 ▼
Croatia	46 ▼
Norway	46 ▼
Czech Republic	46 ▼
United Arab Emirates	44 ▼
Bahrain	42 ▼
Saudi Arabia	42 ▼
Slovak Republic	42 ▼
Iran, Islamic Rep. of	42 ▼
Malta	40 ▼
Oman	36 ▼
Kuwait	34 ▼
Morocco	34 ▼
Armenia	33 ▼
Yemen	29 ▼

**Benchmarking education system**

Florida-USA	71 ▲
North Carolina-USA	70 ▲
Alberta-CAN	67 ▲
Ontario-CAN	60
Quebec-CAN	51 ▼
Dubai-UAE	49 ▼
Abu Dhabi-UAE	42 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Applying

Item label: Boiled egg in cold water

A hot, boiled egg is put into a cup of cold water. What happens to the temperature of the water and the egg?

- A. The water gets colder and the egg gets warmer.
- B. The water gets warmer and the egg gets colder.
- C. The water temperature stays the same and the egg gets colder.
- D. Both the water and the egg get warmer.

Item Number: S031298

Correct Response:

**B**

### Overall Percent Correct

Education system	Percent correct
Singapore	73 ▲
Korea, Rep. of	67 ▲
Romania	54 ▲
Azerbaijan	52 ▲
Turkey	51 ▲
Japan	51 ▲
Hong Kong-CHN	43 ▲
Slovak Republic	43 ▲
Chinese Taipei-CHN	43 ▲
Portugal	41 ▲
Serbia	39
Russian Federation	39 ▲
Georgia	38
Lithuania	37
Morocco	37
<b>United States</b>	<b>35</b>
Saudi Arabia	35
Italy	34
Croatia	34
<b>International average</b>	<b>34</b>
Armenia	34
Kuwait	34
Thailand	33
Finland	32
Qatar	31
Bahrain	30
Poland	30 ▼
England-GBR	30
United Arab Emirates	30 ▼
Chile	30 ▼
Norway	29
Ireland	29
Iran, Islamic Rep. of	29 ▼
Denmark	29 ▼
Germany	28 ▼
Czech Republic	28 ▼
Hungary	27 ▼
Malta	27 ▼
Austria	27 ▼
Northern Ireland-GBR	27 ▼
Slovenia	27 ▼
Yemen	26 ▼
Oman	26 ▼
Australia	26 ▼
New Zealand	26 ▼
Sweden	26 ▼
Tunisia	25 ▼
Belgium (Flemish)-BEL	24 ▼
Spain	23 ▼
Kazakhstan	21 ▼
Netherlands	14 ▼

### Benchmarking education system

Florida-USA	33
Alberta-CAN	32
Dubai-UAE	31
North Carolina-USA	30
Abu Dhabi-UAE	27 ▼
Ontario-CAN	25 ▼
Quebec-CAN	15 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Knowing

Item label: Sunlight made up of colors

Name one thing you have seen that shows that sunlight is made up of different colors.

### Overall Percent Correct

Education system	Percent correct
Singapore	68 ▲
Serbia	63 ▲
Romania	62 ▲
Portugal	54 ▲
Denmark	53 ▲
Ireland	52 ▲
<b>United States</b>	<b>51 ▲</b>
<i>Hong Kong-CHN</i>	50 ▲
Croatia	50 ▲
Finland	49 ▲
Russian Federation	47 ▲
Spain	45 ▲
Lithuania	45 ▲
<i>Belgium (Flemish)-BEL</i>	45 ▲
Korea, Rep. of	43 ▲
Italy	43 ▲
Sweden	42
Germany	42 ▼
Netherlands	41
Australia	41
<i>Northern Ireland-GBR</i>	40
Czech Republic	39
Slovak Republic	39
Bahrain	39
<i>England-GBR</i>	39
<b>International average</b>	<b>38</b>
New Zealand	37
Kazakhstan	37
Hungary	37
Chile	37
<i>Chinese Taipei-CHN</i>	36
Iran, Islamic Rep. of	35
Turkey	34
Azerbaijan	33
Austria	33 ▼
Slovenia	33
Norway	32
Oman	31 ▼
Saudi Arabia	31 ▼
Georgia	30 ▼
Japan	29 ▼
Malta	29 ▼
United Arab Emirates	28 ▼
Qatar	25 ▼
Thailand	22 ▼
Poland	22 ▼
Tunisia	19 ▼
Armenia	17 ▼
Kuwait	16 ▼
Morocco	13 ▼
Yemen	5 ▼

### Benchmarking education system

<i>Florida-USA</i>	58 ▲
<i>Alberta-CAN</i>	58 ▲
<i>North Carolina-USA</i>	54 ▲
<i>Ontario-CAN</i>	51 ▲
<i>Quebec-CAN</i>	33 ▼
<i>Dubai-UAE</i>	31 ▼
<i>Abu Dhabi-UAE</i>	25 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S031299

### SCORING

#### Correct Response

- Refers to a prism (or equivalent).  
Example: Light shining into broken glass.
  - Refers to a rainbow.
  - Refers to sunset or sunrise (or similar).  
Example: When the sun goes down.
  - Other correct
- Examples:
- Soap bubbles.
  - Oil slicks.

#### Incorrect Response

- Incorrect (including crossed out, erased, stray marks, illegible, or off task)  
Example: Day and night.  
Day and night.  
Glass  
Mirror

Item label: Sunlight made up of colors (continued)

S031299:

## Student Responses

**Correct Response:**

prism

**Incorrect Response:**

Reflection

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Forces and Motion	Knowing

Item label: Force that causes object to fall

What causes an object to fall to the ground when you let it drop from your hand?

- A. magnetism
- B. gravity
- C. air resistance
- D. the push from your hand

Item Number: S031311

Correct Response:

**B**

### Overall Percent Correct

Education system	Percent correct
Finland	85 ▲
Slovak Republic	83 ▲
<b>United States</b>	<b>81 ▲</b>
Hong Kong-CHN	80 ▲
England-GBR	80 ▲
Australia	79 ▲
Korea, Rep. of	79 ▲
Chinese Taipei-CHN	78 ▲
Denmark	78 ▲
Netherlands	73 ▲
Northern Ireland-GBR	71 ▲
Ireland	71 ▲
Sweden	71 ▲
Turkey	70 ▲
Spain	70 ▲
Japan	70 ▲
Singapore	68 ▲
New Zealand	66 ▲
Belgium (Flemish)-BEL	66 ▲
Norway	65
Germany	65
Bahrain	65
Poland	63
Romania	63
Saudi Arabia	63
Austria	62
Serbia	62
Hungary	62
Russian Federation	61
<b>International average</b>	<b>61</b>
Italy	60
Georgia	60
Thailand	59
Kuwait	58
Chile	57
Slovenia	56
United Arab Emirates	56 ▼
Iran, Islamic Rep. of	56
Portugal	56 ▼
Czech Republic	51 ▼
Croatia	50 ▼
Malta	49 ▼
Oman	46 ▼
Qatar	45 ▼
Azerbaijan	45 ▼
Kazakhstan	43 ▼
Yemen	34 ▼
Tunisia	34 ▼
Lithuania	31 ▼
Armenia	28 ▼
Morocco	23 ▼

### Benchmarking education system

Ontario-CAN	81 ▲
Alberta-CAN	80 ▲
Florida-USA	79 ▲
North Carolina-USA	76 ▲
Quebec-CAN	63
Dubai-UAE	60
Abu Dhabi-UAE	52 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Applying

Item label: Heat to change state of water

During freezing, melting, and boiling, water changes from one state to another state.

Heat needs to be supplied for which of these to take place?

A. boiling only

B. melting only

C. melting and freezing but not boiling

D. melting and boiling but not freezing

Item Number: S031371

Correct Response:	D
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### Overall Percent Correct

Education system	Percent correct
Germany	73 ▲
Austria	68 ▲
Slovenia	67 ▲
Singapore	66 ▲
Russian Federation	66 ▲
Korea, Rep. of	64 ▲
Croatia	62 ▲
<b>United States</b>	<b>61 ▲</b>
Finland	60 ▲
Lithuania	59 ▲
Chile	58 ▲
Sweden	57 ▲
Norway	54 ▲
England-GBR	53 ▲
Hungary	51 ▲
Northern Ireland-GBR	50
Serbia	50
Italy	50
Ireland	50
Hong Kong-CHN	50
Kazakhstan	49
Belgium (Flemish)-BEL	49
Poland	48
Malta	48
<b>International average</b>	<b>47</b>
New Zealand	47
Australia	46
Bahrain	45
Thailand	44
Japan	44
Chinese Taipei-CHN	44
Slovak Republic	43
United Arab Emirates	43 ▼
Iran, Islamic Rep. of	42 ▼
Saudi Arabia	41 ▼
Tunisia	41 ▼
Qatar	40 ▼
Turkey	40 ▼
Denmark	39 ▼
Romania	38 ▼
Spain	37 ▼
Armenia	37 ▼
Kuwait	35 ▼
Oman	35 ▼
Czech Republic	35 ▼
Portugal	34 ▼
Azerbaijan	34 ▼
Netherlands	33 ▼
Georgia	27 ▼
Yemen	27 ▼
Morocco	25 ▼

### Benchmarking education system

North Carolina-USA	69 ▲
Florida-USA	65 ▲
Alberta-CAN	59 ▲
Ontario-CAN	54 ▲
Dubai-UAE	46
Abu Dhabi-UAE	42 ▼
Quebec-CAN	37 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Knowing

Item label: Which is a mixture

Which of these is a mixture?

A. salt water

B. sugar

C. water vapor

D. salt

Item Number: S031410

Correct Response:	A
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### Overall Percent Correct

Education system	Percent correct
Turkey	88 ▲
Korea, Rep. of	82 ▲
Georgia	79 ▲
<b>United States</b>	<b>79 ▲</b>
Portugal	78 ▲
Finland	77 ▲
<i>Chinese Taipei-CHN</i>	76 ▲
Azerbaijan	76 ▲
Hungary	75 ▲
Romania	75 ▲
Austria	75 ▲
Denmark	75 ▲
Singapore	75 ▲
Bahrain	73 ▲
Russian Federation	73 ▲
Armenia	72 ▲
Spain	72 ▲
Saudi Arabia	71 ▲
Germany	71 ▲
United Arab Emirates	69 ▲
<i>England-GBR</i>	69
<i>Northern Ireland-GBR</i>	69
<i>Belgium (Flemish)-BEL</i>	68 ▲
Ireland	67
Chile	67
Sweden	66
Lithuania	65
Norway	65
Oman	65
New Zealand	65
<b>International average</b>	<b>64</b>
Australia	64
Netherlands	64
Japan	61
<i>Hong Kong-CHN</i>	60 ▼
Italy	59 ▼
Qatar	58 ▼
Serbia	57 ▼
Iran, Islamic Rep. of	57 ▼
Kazakhstan	54 ▼
Malta	53 ▼
Poland	52 ▼
Slovak Republic	52 ▼
Kuwait	51 ▼
Slovenia	48 ▼
Czech Republic	47 ▼
Morocco	42 ▼
Croatia	40 ▼
Thailand	37 ▼
Tunisia	35 ▼
Yemen	34 ▼

### Benchmarking education system

<i>Florida-USA</i>	77 ▲
<i>North Carolina-USA</i>	76 ▲
<i>Dubai-UAE</i>	74 ▲
<i>Alberta-CAN</i>	73 ▲
<i>Ontario-CAN</i>	70 ▲
<i>Quebec-CAN</i>	65
<i>Abu Dhabi-UAE</i>	65

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Applying

Item label: Position of piece of ice in water

A piece of ice is placed in a glass of water. Which picture best shows the position of the ice in the water?

A. B. C. D.

Item Number: S031418

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Japan	83 ▲
Singapore	76 ▲
Korea, Rep. of	75 ▲
Finland	74 ▲
Denmark	73 ▲
<b>United States</b>	<b>61 ▲</b>
Sweden	60 ▲
Hong Kong-CHN	59 ▲
Chinese Taipei-CHN	59 ▲
Australia	58 ▲
Norway	55 ▲
Northern Ireland-GBR	55 ▲
Netherlands	53 ▲
Belgium (Flemish)-BEL	52 ▲
Czech Republic	52 ▲
New Zealand	51 ▲
England-GBR	51 ▲
Croatia	51 ▲
Slovenia	51 ▲
Ireland	50 ▲
Thailand	49 ▲
Portugal	49
Russian Federation	48 ▼
Chile	46
Lithuania	46
Austria	45
Slovak Republic	44
<b>International average</b>	<b>44</b>
Spain	43
Malta	43
Germany	41
Poland	40
Hungary	39 ▼
Italy	37 ▼
Bahrain	37 ▼
Qatar	33 ▼
United Arab Emirates	31 ▼
Romania	29 ▼
Serbia	28 ▼
Kuwait	28 ▼
Iran, Islamic Rep. of	26 ▼
Saudi Arabia	26 ▼
Azerbaijan	25 ▼
Kazakhstan	22 ▼
Oman	22 ▼
Turkey	21 ▼
Georgia	21 ▼
Yemen	18 ▼
Armenia	18 ▼
Morocco	14 ▼
Tunisia	12 ▼

**Benchmarking education system**

Florida-USA	69 ▲
North Carolina-USA	68 ▲
Quebec-CAN	64 ▲
Alberta-CAN	62 ▲
Ontario-CAN	57 ▲
Dubai-UAE	38 ▼
Abu Dhabi-UAE	28 ▼

▲ Percent higher than International average  
▼ Percent lower than International average



Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Knowing

Item label: Materials that will burn

Some of the materials below will burn and some will not. Put an X in the box next to the materials that will burn.

(You may put an X in more than one box.)

water

wood

sand

gasoline

air

Item Number: S031421

**SCORING**

**Correct Response**

- Wood AND Gasoline (no incorrect materials are checked).

**Incorrect Response**

- Wood AND Air (no other materials are checked)
- Gasoline AND Air (no other materials are checked)
- Water OR Sand (even if correct materials are also checked)
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

**Overall Percent Correct**

Education system	Percent correct
Germany	87 ▲
Russian Federation	87 ▲
Czech Republic	86 ▲
Croatia	81 ▲
Finland	81 ▲
Hungary	80 ▲
Austria	80 ▲
Lithuania	78 ▲
Serbia	77 ▲
Romania	76 ▲
Slovak Republic	74 ▲
Denmark	73 ▲
Netherlands	73 ▲
Kazakhstan	73 ▲
Turkey	72 ▲
Poland	71 ▲
Azerbaijan	69 ▲
Japan	68 ▲
Portugal	67 ▲
Italy	66 ▲
Northern Ireland-GBR	64
Armenia	64
Slovenia	64
Belgium (Flemish)-BEL	63
Norway	62
Ireland	62
Georgia	61
<b>International average</b>	<b>61</b>
England-GBR	60
Sweden	60
Australia	57
<b>United States</b>	<b>56 ▼</b>
Spain	55 ▼
Chile	55 ▼
Chinese Taipei-CHN	54 ▼
Saudi Arabia	52 ▼
Korea, Rep. of	52 ▼
New Zealand	51 ▼
Bahrain	51 ▼
Singapore	51 ▼
Iran, Islamic Rep. of	50 ▼
Malta	50 ▼
United Arab Emirates	47 ▼
Hong Kong-CHN	45 ▼
Tunisia	43 ▼
Oman	40 ▼
Thailand	36 ▼
Qatar	35 ▼
Kuwait	30 ▼
Morocco	23 ▼
Yemen	17 ▼

**Benchmarking education system**

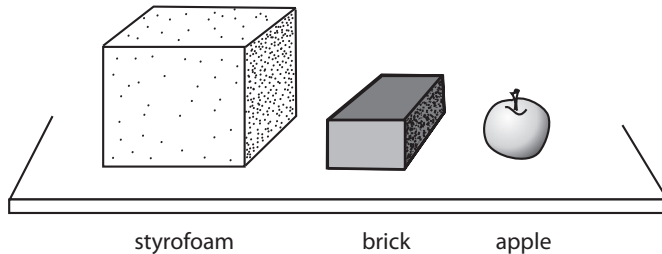
Quebec-CAN	60
North Carolina-USA	59
Alberta-CAN	58
Florida-USA	57
Ontario-CAN	54 ▼
Dubai-UAE	50 ▼
Abu Dhabi-UAE	45 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Reasoning

## Item label: Styrofoam-brick-apple weigh more

Jack's teacher places three objects on a table, as shown below. She puts them in order according to their volume.



Jack thinks that objects with more volume weigh more.

A. Do you agree with him?

(Check one box.)

- Yes  
 No

B. Explain your answer.

Item Number: S041048

### SCORING

#### Correct Response

- No with an explanation based on weight and/or denseness of material.

Examples:

Styrofoam is much larger than the other two objects and it probably does not weigh as much.

The brick has a smaller volume but it probably weighs more than the styrofoam.

The styrofoam is the least dense but it has more volume than the other two.

#### Incorrect Response

- No with an incorrect or no explanation.
- Yes with an explanation based on objects with more volume weighing more.

Examples:

The styrofoam is bigger so it has to weigh more.

It has to have volume to weigh more.

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

### Overall Percent Correct

Education system	Percent correct
Chinese Taipei-CHN	74 ▲
Austria	74 ▲
Serbia	72 ▲
Russian Federation	71 ▲
Finland	71 ▲
Korea, Rep. of	68 ▲
Hungary	68 ▲
Norway	62 ▲
Portugal	61 ▲
Poland	58 ▲
Sweden	56 ▲
Italy	56 ▲
Czech Republic	55 ▲
Lithuania	54 ▲
Slovak Republic	53 ▲
Singapore	52 ▲
Germany	51 ▲
Hong Kong-CHN	49 ▲
Croatia	47 ▲
<b>United States</b>	<b>46 ▲</b>
Denmark	46
Japan	45
Belgium (Flemish)-BEL	45
Kazakhstan	45
Slovenia	43
Australia	43
Spain	42
<b>International average</b>	<b>42</b>
Chile	41
Netherlands	40
Northern Ireland-GBR	40
Ireland	39
England-GBR	39
New Zealand	39
Romania	38
Turkey	36 ▼
Saudi Arabia	35 ▼
Thailand	30 ▼
Iran, Islamic Rep. of	24 ▼
Kuwait	23 ▼
Oman	21 ▼
United Arab Emirates	19 ▼
Azerbaijan	19 ▼
Georgia	19 ▼
Bahrain	19 ▼
Malta	19 ▼
Armenia	18 ▼
Tunisia	15 ▼
Qatar	12 ▼
Yemen	3 ▼
Morocco	# ▼

### Benchmarking education system

Alberta-CAN	52 ▲
Ontario-CAN	51 ▲
Quebec-CAN	51 ▲
North Carolina-USA	49 ▲
Florida-USA	40
Dubai-UAE	24 ▼
Abu Dhabi-UAE	18 ▼

▲ Percent higher than International average

▼ Percent lower than International average

# Rounds to zero

Item label: Styrofoam-brick-apple weigh more (continued)

S041048:

## Student Responses

### Correct Response:

Jack thinks that objects with more volume weigh more.

A. Do you agree with him?

(Check one box.)

Yes

No

B. Explain your answer.

No Because a brick is heavier than a styrofoam cube

### Incorrect Response:

Jack thinks that objects with more volume weigh more.

A. Do you agree with him?

(Check one box.)

Yes

No

B. Explain your answer.

I said yes because it is true that objects with more volume weigh

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Reasoning

Item label: Properties of two materials

The table below shows the properties of two materials.

Properties of Material 1	Properties of Material 2
Conducts heat quickly	Conducts heat slowly
Solid	Solid
Does not dissolve in water	Dissolves in water
Attracted by magnets	Not attracted by magnets

Which statement about materials 1 and 2 is **most** likely to be correct?

- A. Material 1 is glass, and material 2 is clay.
- B. Material 1 is copper, and material 2 is wood.
- C. Material 1 is iron, and material 2 is sugar.
- D. Material 1 is cork, and material 2 is gold.

Item Number: S041049

**Correct Response:**

**C**

### Overall Percent Correct

Education system	Percent correct
Chinese Taipei-CHN	81 ▲
Singapore	78 ▲
Japan	74 ▲
Korea, Rep. of	69 ▲
Russian Federation	67 ▲
Finland	66 ▲
Hong Kong-CHN	66 ▲
Netherlands	62 ▲
Portugal	60 ▲
Croatia	59 ▲
Slovak Republic	59 ▲
Hungary	58 ▲
Serbia	58 ▲
Turkey	53 ▲
Czech Republic	51
Slovenia	51
Kazakhstan	50
Sweden	50
<b>United States</b>	<b>50</b>
Germany	50
Austria	50
Belgium (Flemish)-BEL	49
Poland	49
Lithuania	49
Italy	48
<b>International average</b>	<b>47</b>
England-GBR	47
Romania	46
Denmark	46
Spain	44
Australia	43 ▼
Azerbaijan	42 ▼
Iran, Islamic Rep. of	41 ▼
New Zealand	40 ▼
Ireland	40 ▼
Saudi Arabia	39 ▼
Northern Ireland-GBR	39 ▼
United Arab Emirates	37 ▼
Chile	37 ▼
Bahrain	37 ▼
Thailand	36 ▼
Norway	36 ▼
Qatar	34 ▼
Malta	33 ▼
Oman	32 ▼
Kuwait	32 ▼
Georgia	30 ▼
Armenia	29 ▼
Tunisia	26 ▼
Yemen	25 ▼
Morocco	24 ▼

### Benchmarking education system

Florida-USA	51
North Carolina-USA	46
Ontario-CAN	44
Alberta-CAN	44
Dubai-UAE	44 ▼
Quebec-CAN	42
Abu Dhabi-UAE	35 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Applying

Item label: Identifies gas

Diagram 1 shows a container X that is filled with a material that could be a solid, liquid, or gas. The container has been sealed with a glass sheet. Container X is placed upside down on an empty container Y, as shown in Diagram 2.

The glass sheet is removed.

A. Which of the diagrams below shows what you would see if the material in container X is a gas? (Check one box.)

Diagram 3       Diagram 4       Diagram 5

B. Explain your answer.

Item Number: S041060

**SCORING**

**Correct Response**

- Diagram 3 and explains that gases expand (or increase in volume) OR that they fill a container (rise up/spread out to take the shape of a container) OR have no definite shape.

Examples:

- Gas does not have a definite volume or shape.
- Gas would fill the space.

**Incorrect Response**

- Diagram 3 with an incorrect or no explanation.
- Example: Diagram 3: It looks like a gas.
- Diagram 4 with or without an explanation.
- Diagram 5 with or without an explanation.
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

**Overall Percent Correct**

Education system	Percent correct
Russian Federation	41 ▲
Finland	37 ▲
Italy	33 ▲
Singapore	30 ▲
England-GBR	30 ▲
<b>United States</b>	<b>29 ▲</b>
Korea, Rep. of	28 ▲
Romania	26 ▲
Northern Ireland-GBR	26 ▲
Australia	24 ▲
Austria	24 ▲
Sweden	24 ▲
Kazakhstan	24 ▲
Chinese Taipei-CHN	22 ▲
Netherlands	22 ▲
Turkey	21 ▲
Portugal	21
Czech Republic	21
Hungary	21
Slovenia	20
New Zealand	20
Ireland	19
Poland	18
<b>International average</b>	<b>18</b>
Hong Kong-CHN	18
Denmark	17
Serbia	16
Spain	16
Chile	16
Japan	16
Germany	16
Slovak Republic	15 ▼
United Arab Emirates	14 ▼
Oman	14 ▼
Iran, Islamic Rep. of	14 ▼
Malta	14 ▼
Croatia	13 ▼
Belgium (Flemish)-BEL	13 ▼
Norway	11 ▼
Qatar	11 ▼
Bahrain	10 ▼
Morocco	10 ▼
Azerbaijan	9 ▼
Thailand	7 ▼
Armenia	6 ▼
Saudi Arabia	6 ▼
Tunisia	6 ▼
Kuwait	5 ▼
Georgia	4 ▼
Yemen	# ▼
Lithuania	—
<b>Benchmarking education system</b>	
Florida-USA	29 ▲
North Carolina-USA	21
Dubai-UAE	20 ▲
Alberta-CAN	19
Ontario-CAN	17
Quebec-CAN	16
Abu Dhabi-UAE	11 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average  
 — Not applicable  
 # Rounds to zero

Item label: Identifies gas (continued)

S041060:

## Student Responses

### Correct Response:

A. Which of the diagrams below shows what you would see if the material in container X is a gas?

(Check one box.)

Diagram 3     
  Diagram 4     
  Diagram 5

B. Explain your answer.

a gas is a air which takes any form in a container

### Incorrect Response:

A. Which of the diagrams below shows what you would see if the material in container X is a gas?

(Check one box.)


Diagram 3     
  Diagram 4     
  Diagram 5

B. Explain your answer.


Because, diagram 5 is a gas, and gas just fills up

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Knowing

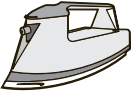
Item label: Type of energy that runs objects



lamp



computer



iron

What type of energy runs the objects shown above?

**Overall Percent Correct**

Education system	Percent correct
Finland	85 ▲
Japan	85 ▲
Korea, Rep. of	83 ▲
Northern Ireland-GBR	80 ▲
England-GBR	78 ▲
Russian Federation	78 ▲
Chinese Taipei-CHN	76 ▲
Lithuania	76 ▲
Belgium (Flemish)-BEL	75 ▲
Hungary	75 ▲
Romania	74 ▲
Portugal	73 ▲
Netherlands	73 ▲
Thailand	72 ▲
Spain	69 ▲
Poland	68 ▲
Austria	68 ▲
Sweden	67 ▲
Denmark	67 ▲
Croatia	64 ▲
Hong Kong-CHN	64 ▲
Serbia	64
Slovenia	63
Kazakhstan	63
Ireland	62
Germany	62
Singapore	62
Australia	62
<b>United States</b>	<b>61</b>
Turkey	61
Czech Republic	60
Slovak Republic	60
International average	59
Georgia	59
Italy	58
Norway	55
Bahrain	55 ▼
Chile	52 ▼
Saudi Arabia	51 ▼
Azerbaijan	48 ▼
Tunisia	45 ▼
Iran, Islamic Rep. of	45 ▼
New Zealand	43 ▼
Armenia	43 ▼
United Arab Emirates	40 ▼
Malta	38 ▼
Qatar	32 ▼
Kuwait	21 ▼
Oman	20 ▼
Morocco	16 ▼
Yemen	12 ▼

Benchmarking education system	Percent correct
Quebec-CAN	73 ▲
Florida-USA	63
Ontario-CAN	60
North Carolina-USA	60
Alberta-CAN	60
Dubai-UAE	44 ▼
Abu Dhabi-UAE	39 ▼

Item Number: S041067

**SCORING**

**Correct Response**

- States that electrical energy runs the objects shown in the diagram.

Examples:

They run by electrical energy.

They all plug into electricity.

**Incorrect Response**

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

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Type of energy that runs objects (continued)

S041067:

## Student Responses

### Correct Response:

electricity

### Incorrect Response:

the computer



Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Applying

Item label: Shadow along which line

A spotlight shines on a girl on a stage.

Her shadow would be seen along which line?

A. A  
B. B  
C. C  
D. D

Item Number: S041069

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Singapore	87 ▲
Chinese Taipei-CHN	83 ▲
Japan	79 ▲
Korea, Rep. of	77 ▲
Hong Kong-CHN	74 ▲
Finland	70 ▲
Slovak Republic	69 ▲
Lithuania	69 ▲
Slovenia	68 ▲
Hungary	67 ▲
Russian Federation	67 ▲
Czech Republic	63
<b>United States</b>	<b>62 ▲</b>
Germany	62
Belgium (Flemish)-BEL	62 ▲
Austria	61
Kazakhstan	61
Portugal	61
Netherlands	60
Serbia	60
Romania	60
Croatia	59
Sweden	58
England-GBR	58
Thailand	58
Australia	57
<b>International average</b>	<b>57</b>
Northern Ireland-GBR	57
New Zealand	56
Denmark	56
Ireland	56
Qatar	55
Spain	54
Chile	53 ▼
Italy	52 ▼
Saudi Arabia	52 ▼
Bahrain	52 ▼
Norway	51 ▼
Iran, Islamic Rep. of	50 ▼
Poland	49 ▼
Georgia	49 ▼
United Arab Emirates	48 ▼
Azerbaijan	47 ▼
Malta	47 ▼
Turkey	47 ▼
Morocco	43 ▼
Oman	42 ▼
Kuwait	41 ▼
Armenia	38 ▼
Tunisia	33 ▼
Yemen	30 ▼

**Benchmarking education system**


Alberta-CAN	65 ▲
Ontario-CAN	57
North Carolina-USA	56
Florida-USA	54
Dubai-UAE	51 ▼
Quebec-CAN	49 ▼
Abu Dhabi-UAE	49 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Forces and Motion	Knowing

Item label: Force causing boat to sail

The picture shows a boat sailing.



Which force causes the boat to move?

A. gravity  
 B. wind  
 C. friction  
 D. magnetism

Item Number: S041117

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Chinese Taipei-CHN	99 ▲
Czech Republic	98 ▲
Slovenia	98 ▲
Austria	98 ▲
Croatia	98 ▲
Poland	97 ▲
Germany	97 ▲
Finland	97 ▲
Italy	96 ▲
Portugal	96 ▲
Russian Federation	96 ▲
Sweden	95 ▲
Australia	95 ▲
Serbia	95 ▲
Northern Ireland-GBR	95 ▲
Denmark	94 ▲
Netherlands	94 ▲
Slovak Republic	94 ▲
Norway	93 ▲
New Zealand	93 ▲
Ireland	93 ▲
Lithuania	93 ▲
Hungary	93 ▲
Japan	93 ▲
<b>United States</b>	<b>93 ▲</b>
Spain	92 ▲
Singapore	92 ▲
Korea, Rep. of	91
Romania	91
England-GBR	91
Belgium (Flemish)-BEL	90
<b>International average</b>	<b>90</b>
Hong Kong-CHN	90
Malta	88
Bahrain	88
Turkey	87 ▼
Kazakhstan	87
Azerbaijan	87
Chile	86 ▼
United Arab Emirates	85 ▼
Iran, Islamic Rep. of	84 ▼
Tunisia	83 ▼
Georgia	83 ▼
Qatar	81 ▼
Saudi Arabia	81 ▼
Oman	80 ▼
Thailand	79 ▼
Armenia	75 ▼
Kuwait	74 ▼
Morocco	71 ▼
Yemen	60 ▼

**Benchmarking education system**

Alberta-CAN	95 ▲
Florida-USA	94 ▲
Ontario-CAN	94 ▲
North Carolina-USA	94 ▲
Quebec-CAN	93 ▲
Dubai-UAE	87 ▼
Abu Dhabi-UAE	86 ▼

▲ Percent higher than International average  
 ▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Knowing

Item label: Objects that produce light

Which two objects produce their own light?

- A. candle and moon
- B. moon and mirror
- C. Sun and candle
- D. mirror and Sun

Item Number: S041120

**Correct Response:**

**C**

### Overall Percent Correct

Education system	Percent correct
Czech Republic	86 ▲
Singapore	81 ▲
Slovak Republic	70 ▲
Georgia	65 ▲
Slovenia	64 ▲
Croatia	62 ▲
Lithuania	59 ▲
Finland	59 ▲
Azerbaijan	58 ▲
Iran, Islamic Rep. of	57 ▲
Portugal	56 ▲
Romania	56 ▲
Italy	56 ▲
Oman	55 ▲
Russian Federation	55 ▲
Spain	54
United Arab Emirates	54 ▲
Qatar	53
Serbia	53
Bahrain	52
<b>United States</b>	<b>51</b>
Sweden	51
Saudi Arabia	50
Austria	50
<b>International average</b>	<b>50</b>
Germany	49
Kuwait	48
Turkey	48
Armenia	48
Poland	47
Malta	46
Chile	46
Kazakhstan	46
New Zealand	45 ▼
Australia	45 ▼
Ireland	45 ▼
Yemen	44 ▼
Hungary	44 ▼
Belgium (Flemish)-BEL	43 ▼
England-GBR	42 ▼
Netherlands	41 ▼
Tunisia	41 ▼
Chinese Taipei-CHN	40 ▼
Denmark	40 ▼
Northern Ireland-GBR	39 ▼
Korea, Rep. of	38 ▼
Thailand	36 ▼
Morocco	36 ▼
Japan	35 ▼
Norway	32 ▼
Hong Kong-CHN	28 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	57 ▲
Abu Dhabi-UAE	56 ▲
Florida-USA	53
Dubai-UAE	51
North Carolina-USA	45
Ontario-CAN	45 ▼
Quebec-CAN	39 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Knowing

Item label: Describes condensation

Which of the following describes condensation?

- A. a liquid changing to a solid
- B. a solid changing to a liquid
- C. a solid changing to a gas
- D. a gas changing to a liquid

Item Number: S041187

**Correct Response:**

**D**

### Overall Percent Correct

Education system	Percent correct
England-GBR	42 ▲
Korea, Rep. of	41 ▲
United Arab Emirates	41 ▲
Lithuania	40 ▲
Kuwait	39 ▲
Portugal	38 ▲
Poland	36 ▲
Singapore	35 ▲
Bahrain	34 ▲
Russian Federation	33 ▲
New Zealand	33 ▲
Kazakhstan	32
Azerbaijan	32
Qatar	32 ▲
<b>United States</b>	<b>32 ▲</b>
Australia	32 ▲
Czech Republic	31
Ireland	31
Northern Ireland-GBR	30
Hungary	30
Malta	29
Oman	29
Saudi Arabia	29
Serbia	28
Chile	28
Sweden	28
<b>International average</b>	<b>28</b>
Romania	27
Yemen	27
Italy	27
Netherlands	26
Armenia	26
Georgia	25
Slovak Republic	25
Morocco	24 ▼
Turkey	24 ▼
Denmark	23 ▼
Slovenia	23 ▼
Belgium (Flemish)-BEL	22 ▼
Germany	21 ▼
Spain	20 ▼
Finland	20 ▼
Norway	19 ▼
Croatia	18 ▼
Tunisia	18 ▼
Austria	18 ▼
Japan	16 ▼
Thailand	16 ▼
Chinese Taipei-CHN	12 ▼
Hong Kong-CHN	—
Iran, Islamic Rep. of	—

### Benchmarking education system

Dubai-UAE	42 ▲
Abu Dhabi-UAE	37 ▲
Quebec-CAN	35 ▲
Florida-USA	33 ▲
North Carolina-USA	30
Ontario-CAN	23 ▼
Alberta-CAN	22 ▼

▲ Percent higher than International average

▼ Percent lower than International average

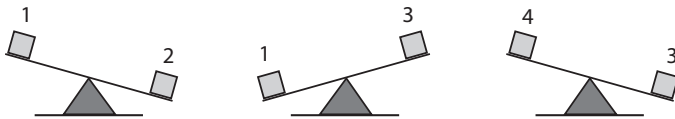
— Not applicable

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Forces and Motion	Reasoning

Item label: A balance and four cubes

Stephanie has a balance and four cubes (1, 2, 3, 4). The cubes are made of different materials.

She puts two cubes at a time on the balance and observes the following results.



What can she know about the weight of cube 2?

- A. It is heavier than cubes 1, 3, and 4.
- B. It is heavier than cube 1 but lighter than cubes 3 and 4.
- C. It is heavier than cube 3 but lighter than cubes 1 and 4.
- D. It is heavier than cube 4 but lighter than cubes 1 and 3.

Item Number: S041305

<b>Correct Response:</b>	<b>A</b>
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Overall Percent Correct

Education system	Percent correct
Singapore	74 ▲
Chinese Taipei-CHN	70 ▲
Korea, Rep. of	70 ▲
Hong Kong-CHN	68 ▲
Japan	66 ▲
Portugal	57 ▲
Ireland	54 ▲
Finland	53 ▲
Netherlands	52 ▲
Australia	50 ▲
Norway	50 ▲
<b>United States</b>	<b>50 ▲</b>
Northern Ireland-GBR	49
Russian Federation	49 ▲
Belgium (Flemish)-BEL	49 ▲
Serbia	49
Kazakhstan	49
Germany	49
England-GBR	48
New Zealand	47
Lithuania	47
Austria	46
Croatia	45
Italy	45
<b>International average</b>	<b>44</b>
Romania	44
Sweden	44
Denmark	44
Turkey	44
Spain	44
Slovak Republic	43
Malta	43
Slovenia	41
Hungary	40 ▼
Bahrain	40 ▼
Czech Republic	39 ▼
Qatar	39 ▼
Thailand	39 ▼
United Arab Emirates	37 ▼
Chile	36 ▼
Iran, Islamic Rep. of	36 ▼
Azerbaijan	35 ▼
Saudi Arabia	35 ▼
Poland	33 ▼
Georgia	31 ▼
Oman	31 ▼
Armenia	30 ▼
Kuwait	27 ▼
Morocco	23 ▼
Yemen	19 ▼
Tunisia	18 ▼

Benchmarking education system

Florida-USA	50
North Carolina-USA	49
Quebec-CAN	48
Ontario-CAN	48
Alberta-CAN	48
Dubai-UAE	40
Abu Dhabi-UAE	36 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Applying

Item label: Thermometer reading hottest water

Four different thermometers were used to measure the temperature of water in four different beakers.

Which thermometer reading belongs to the hottest water?

Thermometer A: 20  
 Thermometer B: 50  
 Thermometer C: 25  
 Thermometer D: 30

Item Number: S041311

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Belgium (Flemish)-BEL	98 ▲
Netherlands	98 ▲
Chinese Taipei-CHN	98 ▲
Russian Federation	97 ▲
Slovak Republic	97 ▲
Korea, Rep. of	97 ▲
Hungary	97 ▲
Ireland	97 ▲
Japan	97 ▲
Singapore	97 ▲
Austria	97 ▲
Sweden	96 ▲
Serbia	96 ▲
Lithuania	96 ▲
Finland	96 ▲
Croatia	96 ▲
Slovenia	96 ▲
Italy	95 ▲
Hong Kong-CHN	95 ▲
Poland	95 ▲
Northern Ireland-GBR	95 ▲
Germany	95 ▲
Portugal	94 ▲
<b>United States</b>	<b>94 ▲</b>
Chile	94 ▲
Denmark	94 ▲
New Zealand	93 ▲
Georgia	93
Australia	93
England-GBR	93
Czech Republic	92
Spain	92
Norway	91
Kazakhstan	91
<b>International average</b>	<b>91</b>
Romania	91
Saudi Arabia	89
Malta	89
Turkey	89 ▼
Bahrain	89
United Arab Emirates	87 ▼
Thailand	87 ▼
Armenia	85 ▼
Azerbaijan	81 ▼
Qatar	81 ▼
Oman	80 ▼
Iran, Islamic Rep. of	79 ▼
Kuwait	79 ▼
Morocco	77 ▼
Tunisia	76 ▼
Yemen	62 ▼

**Benchmarking education system**


Ontario-CAN	94 ▲
North Carolina-USA	94
Alberta-CAN	93
Quebec-CAN	93
Florida-USA	92
Dubai-UAE	87 ▼
Abu Dhabi-UAE	85 ▼


▲ Percent higher than International average  
 ▼ Percent lower than International average


Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Forces and Motion	Reasoning

Item label: Children on seesaw

Nick rides on a seesaw with his sister Kate and then with his brother Leon. Nick is the same weight as Kate, but Leon is twice the weight of Nick.

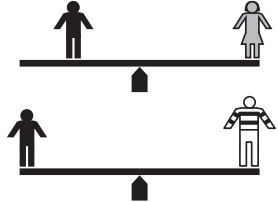
  
Nick

  
Kate

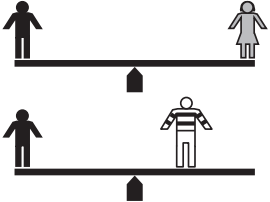
  
Leon

Which figure shows where the children should sit so that Nick can balance first with Kate and then with Leon?

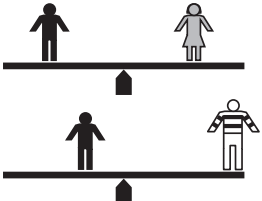
A.



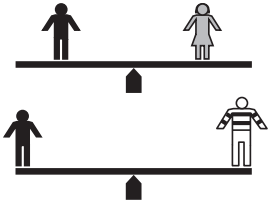
B.



C.



D.



Item Number: S051071

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	81 ▲
Finland	68 ▲
Japan	66 ▲
Sweden	63 ▲
Netherlands	63 ▲
Czech Republic	61 ▲
Germany	61 ▲
Denmark	60 ▲
Lithuania	56 ▲
Slovenia	54 ▲
Austria	53 ▲
Russian Federation	52 ▲
Norway	52 ▲
Serbia	51 ▲
Hungary	51 ▲
Singapore	51 ▲
Slovak Republic	50 ▲
England-GBR	50 ▲
New Zealand	49 ▲
Belgium (Flemish)-BEL	48
Hong Kong-CHN	48
Australia	47
Croatia	47
<b>United States</b>	<b>46</b>
Chinese Taipei-CHN	46
Romania	45
<b>International average</b>	<b>44</b>
Italy	42
Kazakhstan	42
Northern Ireland-GBR	40
Ireland	40
Spain	40
Poland	39 ▼
Portugal	38 ▼
Azerbaijan	38 ▼
Chile	37 ▼
Turkey	37 ▼
Saudi Arabia	36 ▼
Malta	35 ▼
Thailand	34 ▼
Georgia	34 ▼
Iran, Islamic Rep. of	31 ▼
United Arab Emirates	30 ▼
Qatar	30 ▼
Oman	27 ▼
Bahrain	27 ▼
Armenia	25 ▼
Morocco	21 ▼
Kuwait	21 ▼
Tunisia	20 ▼
Yemen	16 ▼

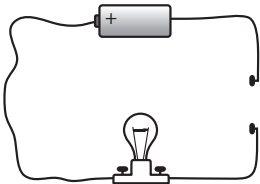
Benchmarking education system	Percent correct
Alberta-CAN	52 ▲
Quebec-CAN	51 ▲
Florida-USA	49
Ontario-CAN	45
North Carolina-USA	41
Dubai-UAE	32 ▼
Abu Dhabi-UAE	28 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Applying

Item label: Will the bulb light

Gerry connects a battery, a light bulb, and some wire as shown below.



A. Will the bulb light?

(Check one box.)

- Yes  
 No

B. Explain your answer.

### Overall Percent Correct

Education system	Percent correct
Japan	72 ▲
Chinese Taipei-CHN	68 ▲
England-GBR	59 ▲
Slovenia	56 ▲
Singapore	51 ▲
Germany	42 ▲
<b>United States</b>	<b>42 ▲</b>
Bahrain	40 ▲
Slovak Republic	40 ▲
Turkey	36 ▲
Korea, Rep. of	35 ▲
Oman	34 ▲
Kuwait	34 ▲
Northern Ireland-GBR	33
Iran, Islamic Rep. of	33 ▲
Saudi Arabia	32
Finland	32 ▲
Qatar	30
Lithuania	30
Malta	30
Austria	29
<b>International average</b>	<b>27</b>
United Arab Emirates	27
Denmark	27
Sweden	26
Czech Republic	26
Romania	25
Serbia	25
Russian Federation	25
Netherlands	24
Ireland	22 ▼
Hong Kong-CHN	22 ▼
Thailand	20 ▼
New Zealand	20 ▼
Kazakhstan	20 ▼
Portugal	19 ▼
Australia	18 ▼
Armenia	17 ▼
Spain	15 ▼
Croatia	14 ▼
Poland	14 ▼
Belgium (Flemish)-BEL	14 ▼
Hungary	13 ▼
Azerbaijan	13 ▼
Georgia	12 ▼
Chile	11 ▼
Tunisia	11 ▼
Italy	10 ▼
Morocco	10 ▼
Norway	7 ▼
Yemen	5 ▼
<b>Benchmarking education system</b>	
North Carolina-USA	43 ▲
Dubai-UAE	30
Abu Dhabi-UAE	28
Florida-USA	24
Alberta-CAN	21 ▼
Quebec-CAN	15 ▼
Ontario-CAN	12 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S051074

### SCORING

#### Correct Response

- No with an explanation that the bulb does not light because the circuit is incomplete.

Examples:

No – There is a gap in the wires.

No – The two wires on the right have to be connected.

#### Incorrect Response

- Yes with an explanation that the bulb would light up if he were to join the wires together.
- Other Incorrect (including crossed out, erased, stray marks, illegible, or off task)



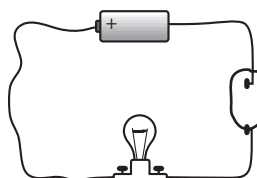
Item label: Will the bulb light (continued)

S051074:

## Student Responses

### Correct Response:

Gerry connects a battery, a light bulb, and some wire as shown below.



A. Will the bulb light?

(Check one box.)

Yes

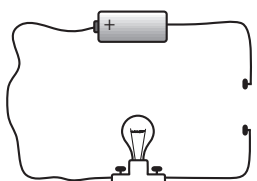
No

B. Explain your answer.

It is open here. It can't connect.

### Incorrect Response:

Gerry connects a battery, a light bulb, and some wire as shown below.



A. Will the bulb light?

(Check one box.)

Yes

No

B. Explain your answer.

yes because it forms a closed circuit.

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Classification and Properties of Matter	Knowing

Item label: Temperature of ice, steam, water

Water, ice, and steam all have different temperatures.

What is the order from coldest to hottest?

A. ice, water, steam

B. ice, steam, water

C. steam, ice, water

D. steam, water, ice

Item Number: S051086

<b>Correct Response:</b>	<b>A</b>
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### Overall Percent Correct

Education system	Percent correct
<b>United States</b>	<b>90</b> ▲
Netherlands	88 ▲
Singapore	87 ▲
Croatia	87 ▲
Czech Republic	86 ▲
Hong Kong-CHN	86 ▲
Italy	84 ▲
Russian Federation	84 ▲
Serbia	84 ▲
Belgium (Flemish)-BEL	84 ▲
Australia	83 ▲
Slovak Republic	83 ▲
Denmark	83 ▲
Finland	82 ▲
Spain	81 ▲
Hungary	81 ▲
Slovenia	80 ▲
Chile	80 ▲
England-GBR	80 ▲
Chinese Taipei-CHN	80 ▲
Korea, Rep. of	80 ▲
Austria	79 ▲
Northern Ireland-GBR	79 ▲
Germany	79 ▲
Sweden	79 ▲
New Zealand	78 ▲
Ireland	76
Norway	75
Kazakhstan	73
<b>International average</b>	<b>73</b>
Japan	72
Turkey	71
Romania	71
Bahrain	71
Lithuania	70
Malta	70
United Arab Emirates	69 ▼
Saudi Arabia	67 ▼
Azerbaijan	65 ▼
Poland	63 ▼
Georgia	62 ▼
Iran, Islamic Rep. of	61 ▼
Qatar	61 ▼
Armenia	59 ▼
Oman	56 ▼
Kuwait	55 ▼
Thailand	55 ▼
Tunisia	41 ▼
Morocco	37 ▼
Yemen	29 ▼
Portugal	—

### Benchmarking education system

Florida-USA	94 ▲
North Carolina-USA	90 ▲
Alberta-CAN	86 ▲
Ontario-CAN	85 ▲
Dubai-UAE	73
Quebec-CAN	72
Abu Dhabi-UAE	70

▲ Percent higher than International average

▼ Percent lower than International average

— Not applicable

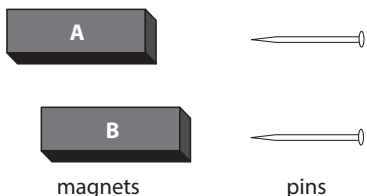
Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Reasoning

## Item label: Two magnets and two metal pins

Betty has two magnets (A and B) and two metal pins that are the same.

She slides Magnet A along a table until a pin is attracted to the magnet.

She slides Magnet B along a table until a pin is attracted to the magnet.



She finds that Magnet A attracts the pin from 15cm and Magnet B attracts the pin from 10cm.

Steven says that both magnets are equally strong.

A. Do you agree?

(Check one box.)

Yes

No

B. Explain your answer.

Item Number: S051119

**SCORING****Correct Response**

- No with an explanation that a stronger magnet (i.e., Magnet A) can attract the pin from a further distance.

Examples:

No – Magnet A attracted the pin from a further distance than Magnet B, so it is stronger.

No – Magnet B had to be closer to the pin so it is weaker.

- No with an explanation that refers to different distances only.

Example: No – The magnets attract from different lengths.

**Incorrect Response**

- Incorrect (including crossed out, erased, stray marks, illegible, or off task), including responses that refer to the strength of the magnet only.

Example: No – Magnet A is stronger.

**Overall Percent Correct**

Education system	Percent correct
Singapore	66 ▲
Japan	50 ▲
Chinese Taipei-CHN	47 ▲
Finland	41 ▲
Sweden	37 ▲
<b>United States</b>	<b>37 ▲</b>
England-GBR	35 ▲
Portugal	35 ▲
Belgium (Flemish)-BEL	35 ▲
Slovenia	32 ▲
Norway	32
Hong Kong-CHN	31 ▲
Northern Ireland-GBR	30
Netherlands	30
Serbia	29
Turkey	29
Denmark	28
Czech Republic	28
Germany	28
Ireland	28
Spain	27
Australia	27
Korea, Rep. of	27
Russian Federation	27
Kazakhstan	27
Poland	26
<b>International average</b>	<b>26</b>
Georgia	26
Iran, Islamic Rep. of	26
Bahrain	26
New Zealand	25
Malta	25
Lithuania	24
Romania	23
Thailand	23 ▼
Italy	23
Hungary	23 ▼
Saudi Arabia	22 ▼
Austria	21 ▼
Slovak Republic	20 ▼
Chile	20 ▼
Tunisia	19 ▼
United Arab Emirates	19 ▼
Qatar	17 ▼
Croatia	17 ▼
Kuwait	15 ▼
Armenia	14 ▼
Azerbaijan	12 ▼
Oman	6 ▼
Morocco	5 ▼
Yemen	1 ▼
<b>Benchmarking education system</b>	
Ontario-CAN	39 ▲
Florida-USA	38 ▲
Alberta-CAN	34 ▲
North Carolina-USA	34 ▲
Quebec-CAN	31 ▲
Dubai-UAE	22
Abu Dhabi-UAE	17 ▼

▲ Percent higher than International average

▼ Percent lower than International average

Item label: Two magnets and two metal pins (continued)

S051119:

## Student Responses

### Correct Response:

A. Do you agree?

(Check one box.)

Yes

No

B. Explain your answer.

Magnet A attracts the pin from 15 cm, while magnet B attracts the pin from 10 cm, thus magnet A is stronger.

### Incorrect Response:

A. Do you agree?

(Check one box.)

Yes

No

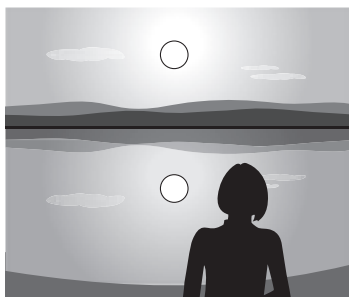
B. Explain your answer.

Because magnets B is not stronger than magnets A.

Content Domain	Main Topic	Cognitive Domain
PHYSICAL SCIENCE	Sources and Effects of Energy	Applying

Item label: Sun reflection in a lake

Alice watches a sunrise from across a calm lake. She sees a sun in the sky and a sun in the lake as shown below.



Why does Alice see a sun in the lake?

- A. The sunlight warms that part of the lake.
- B. The sky spreads sunlight over the lake.
- C. The sunlight reflects off the lake water.
- D. Clouds reflect sunlight into the lake.

Item Number: S051179

**Correct Response:**

**C**

### Overall Percent Correct

Education system	Percent correct
Chinese Taipei-CHN	95 ▲
Korea, Rep. of	93 ▲
Poland	93 ▲
Czech Republic	93 ▲
Austria	93 ▲
Northern Ireland-GBR	92 ▲
Italy	92 ▲
Spain	92 ▲
Finland	92 ▲
Germany	91 ▲
Japan	91 ▲
Ireland	91 ▲
<b>United States</b>	<b>90 ▲</b>
Singapore	90 ▲
Hungary	90 ▲
England-GBR	88 ▲
Netherlands	88 ▲
Portugal	87 ▲
Belgium (Flemish)-BEL	87 ▲
Chile	86 ▲
Russian Federation	85 ▲
Sweden	85 ▲
Romania	84 ▲
Slovak Republic	84 ▲
Australia	84 ▲
New Zealand	84 ▲
Lithuania	79
Malta	77
Thailand	76
<b>International average</b>	<b>76</b>
Hong Kong-CHN	73
Denmark	73
Bahrain	72
Slovenia	70 ▼
Turkey	70 ▼
Saudi Arabia	70 ▼
Azerbaijan	66 ▼
United Arab Emirates	66 ▼
Kazakhstan	64 ▼
Norway	63 ▼
Croatia	62 ▼
Serbia	61 ▼
Qatar	59 ▼
Kuwait	58 ▼
Georgia	52 ▼
Iran, Islamic Rep. of	52 ▼
Oman	52 ▼
Tunisia	43 ▼
Yemen	36 ▼
Morocco	34 ▼
Armenia	30 ▼

### Benchmarking education system

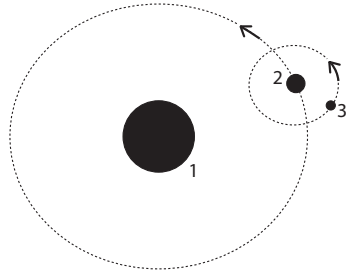
Florida-USA	94 ▲
Alberta-CAN	93 ▲
North Carolina-USA	89 ▲
Ontario-CAN	87 ▲
Quebec-CAN	76
Dubai-UAE	72
Abu Dhabi-UAE	62 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
EARTH SCIENCE	Earth in the Solar System	Reasoning

Item label: Label Earth, Moon, and Sun

The figure below shows Earth, the Moon, and the Sun. Each body is labeled by a number. The arrows show the direction each body is moving.



Fill in the correct number next to each body (1, 2 or 3).

Earth is body number: \_\_\_\_\_

The Moon is body number: \_\_\_\_\_

The Sun is body number: \_\_\_\_\_

Item Number: S031044

**SCORING**

**Correct Response**

- Earth = 2
- Moon = 3
- Sun = 1

**Incorrect Response**

- Only the Sun is correct (3 – 2 – 1)
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

**Overall Percent Correct**

Education system	Percent correct
Portugal	78 ▲
Russian Federation	74 ▲
Korea, Rep. of	73 ▲
Slovak Republic	66 ▲
<b>United States</b>	<b>65 ▲</b>
Finland	65 ▲
Sweden	64 ▲
England-GBR	63 ▲
Norway	60 ▲
Spain	59 ▲
Chile	59 ▲
Hong Kong-CHN	58 ▲
United Arab Emirates	55 ▲
Australia	54 ▲
Lithuania	54 ▲
Japan	53 ▲
Austria	53
Czech Republic	52
Denmark	52
Chinese Taipei-CHN	52
Kuwait	51
Bahrain	51
Hungary	51
Malta	50
Ireland	50
Kazakhstan	49
Netherlands	49
Poland	49
<b>International average</b>	<b>49</b>
Slovenia	48
Thailand	48
Singapore	48
Qatar	47
Romania	47
Germany	44
Italy	44 ▼
New Zealand	44 ▼
Croatia	43 ▼
Iran, Islamic Rep. of	42 ▼
Georgia	40 ▼
Saudi Arabia	39 ▼
Belgium (Flemish)-BEL	39 ▼
Azerbaijan	39 ▼
Serbia	39 ▼
Turkey	38 ▼
Northern Ireland-GBR	35 ▼
Oman	30 ▼
Armenia	27 ▼
Tunisia	17 ▼
Morocco	16 ▼
Yemen	15 ▼
<b>Benchmarking education system</b>	
Florida-USA	68 ▲
North Carolina-USA	63 ▲
Quebec-CAN	59 ▲
Dubai-UAE	58 ▲
Abu Dhabi-UAE	54 ▲
Alberta-CAN	48
Ontario-CAN	46

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Label Earth, Moon, and Sun (continued)

S031044:

## Student Responses

### Correct Response:

Earth is body number: \_\_\_\_\_ 2 \_\_\_\_\_

The Moon is body number: \_\_\_\_\_ 3 \_\_\_\_\_

The Sun is body number: \_\_\_\_\_ 1 \_\_\_\_\_

### Incorrect Response:

Earth is body number: \_\_\_\_\_ 1 \_\_\_\_\_

The Moon is body number: \_\_\_\_\_ 3 \_\_\_\_\_

The Sun is body number: \_\_\_\_\_ 2 \_\_\_\_\_

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Knowing

Item label: Two ways to use air-DERIVED

Air is important for many things. What are two ways we use air?

1.

2.

Item Number: S031088Z

### SCORING

Note: Each of the two responses are scored separately. However, if the two responses are essentially the same, the second response should be scored as "Incorrect Response".

#### Correct Response

- States that air (oxygen) is needed for breathing.  
Example: Humans breathe air.
- States that air (oxygen) is needed for fire, burning (or similar).  
Example: Air is used in fire.
- States that air is used to inflate things (e.g., balloons, balls, tires, blow bubbles, etc.).  
Example: To blow up balloons.
- States an effect due to air movement or pressure (or similar).  
Example: Air is needed for airplanes to fly.
- Other correct

#### Incorrect Response

- Response too vague.  
Example: To stay alive.
- Refers only to plants needing air (or similar)
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	34 ▲
Sweden	28 ▲
Chinese Taipei-CHN	28 ▲
Kazakhstan	27 ▲
Singapore	26 ▲
Russian Federation	26 ▲
Finland	26 ▲
Serbia	24 ▲
Romania	23 ▲
Portugal	22 ▲
Japan	22 ▲
New Zealand	21 ▲
Lithuania	21 ▲
<b>United States</b>	<b>21 ▲</b>
Tunisia	21 ▲
Netherlands	20 ▲
Ireland	20
Hong Kong-CHN	19
Poland	19
Denmark	19
Slovak Republic	18
Bahrain	18
Italy	18
<b>International average</b>	<b>16</b>
Hungary	16
Czech Republic	16
Spain	16
Saudi Arabia	15
Slovenia	15
Belgium (Flemish)-BEL	15
United Arab Emirates	15
Austria	14
Norway	14
Australia	13 ▼
Oman	12 ▼
Turkey	11 ▼
Chile	11 ▼
Qatar	11 ▼
Germany	10 ▼
Malta	10 ▼
Northern Ireland-GBR	9 ▼
England-GBR	9 ▼
Croatia	9 ▼
Thailand	9 ▼
Kuwait	8 ▼
Georgia	7 ▼
Iran, Islamic Rep. of	7 ▼
Azerbaijan	6 ▼
Armenia	5 ▼
Yemen	5 ▼
Morocco	2 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	19
Florida-USA	18
Ontario-CAN	15
North Carolina-USA	15
Abu Dhabi-UAE	15
Dubai-UAE	13 ▼
Quebec-CAN	9 ▼

▲ Percent higher than International average  
▼ Percent lower than International average



Item label: Two ways to use air (continued)

S031088Z:

## Student Responses

### Correct Response:

1. To blow up stuff,

2. To breathe.

### Incorrect Response:

1. to breath

2. to help plants grow

Content Domain	Main Topic	Cognitive Domain
EARTH SCIENCE	Earth in the Solar System	Applying

Item label: Explanation for day and night

What is the correct explanation for why we have day and night on Earth?

- A. The Sun orbits around the Earth.
- B. Earth orbits around the Sun.
- C. Earth turns on its axis.
- D. The Sun turns on its axis.

Item Number: S031275

**Correct Response:**

**C**

### Overall Percent Correct

Education system	Percent correct
Slovak Republic	58 ▲
Czech Republic	58 ▲
Russian Federation	54 ▲
Lithuania	52 ▲
Chile	52 ▲
Azerbaijan	47 ▲
Germany	46 ▲
Bahrain	46 ▲
Slovenia	46 ▲
Saudi Arabia	45 ▲
Armenia	44 ▲
Austria	44 ▲
Portugal	44 ▲
Hong Kong-CHN	43 ▲
Qatar	42 ▲
Poland	40 ▲
Hungary	39 ▲
Finland	39 ▲
Turkey	39 ▲
Serbia	37
Georgia	37
England-GBR	37
Croatia	37
Chinese Taipei-CHN	36
United Arab Emirates	36
Kazakhstan	35
<b>International average</b>	<b>35</b>
Spain	34
Romania	32
<b>United States</b>	<b>32</b>
Belgium (Flemish)-BEL	32
Sweden	30
Australia	30 ▼
Singapore	29 ▼
Kuwait	29 ▼
Japan	28 ▼
Denmark	27 ▼
Thailand	25 ▼
Netherlands	25 ▼
Iran, Islamic Rep. of	24 ▼
Italy	23 ▼
Malta	23 ▼
Oman	23 ▼
New Zealand	22 ▼
Yemen	21 ▼
Korea, Rep. of	20 ▼
Ireland	20 ▼
Morocco	19 ▼
Tunisia	18 ▼
Northern Ireland-GBR	16 ▼
Norway	14 ▼

### Benchmarking education system

Dubai-UAE	38
Florida-USA	38
Abu Dhabi-UAE	37
Quebec-CAN	27 ▼
North Carolina-USA	25 ▼
Alberta-CAN	22 ▼
Ontario-CAN	21 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Knowing

Item label: Best soil for plants to grow in

Plants grow best in soils that are rich in which of the following?

- A. grains of sand
- B. lumps of clay
- C. layers of gravel
- D. decaying plants and animals

Item Number: S031376

<b>Correct Response:</b>	<b>D</b>
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**Overall Percent Correct**

Education system	Percent correct
Thailand	75 ▲
Czech Republic	73 ▲
Korea, Rep. of	67 ▲
Finland	63 ▲
Croatia	61 ▲
Slovak Republic	60 ▲
Russian Federation	60 ▲
Serbia	59 ▲
Italy	58 ▲
Chinese Taipei-CHN	57 ▲
Sweden	56 ▲
Azerbaijan	55 ▲
Hungary	54 ▲
Denmark	53 ▲
Kazakhstan	52 ▲
Portugal	49 ▲
<b>United States</b>	<b>48 ▲</b>
Armenia	46 ▲
Hong Kong-CHN	46 ▲
New Zealand	46 ▲
Slovenia	46 ▲
Romania	46 ▲
England-GBR	46 ▲
<b>International average</b>	<b>40</b>
Norway	40
Australia	39
Malta	37
Poland	35 ▼
Northern Ireland-GBR	35 ▼
Spain	34 ▼
Ireland	34 ▼
Chile	32 ▼
Austria	31 ▼
Japan	29 ▼
Bahrain	28 ▼
Germany	28 ▼
Oman	28 ▼
Lithuania	28 ▼
Qatar	27 ▼
United Arab Emirates	26 ▼
Turkey	26 ▼
Tunisia	25 ▼
Georgia	24 ▼
Yemen	23 ▼
Morocco	21 ▼
Singapore	20 ▼
Netherlands	20 ▼
Belgium (Flemish)-BEL	20 ▼
Saudi Arabia	19 ▼
Kuwait	16 ▼
Iran, Islamic Rep. of	14 ▼

**Benchmarking education system**

Alberta-CAN	64 ▲
North Carolina-USA	58 ▲
Ontario-CAN	55 ▲
Quebec-CAN	52 ▲
Florida-USA	49 ▲
Dubai-UAE	31 ▼
Abu Dhabi-UAE	24 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Knowing

Item label: Soil change due to natural causes

Which of these soil changes is due only to natural causes?

A. Loss of minerals due to farming.

B. Deserts forming due to tree cutting.

C. Flooding due to dam construction.

D. Minerals washing out due to heavy rain.

Item Number: S031389

<b>Correct Response:</b>	<b>D</b>
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### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	63 ▲
Finland	61 ▲
Russian Federation	60 ▲
Japan	55 ▲
<b>United States</b>	<b>54 ▲</b>
Kazakhstan	53 ▲
Azerbaijan	52 ▲
Slovak Republic	51 ▲
Hungary	51 ▲
Croatia	48 ▲
Turkey	48 ▲
Chinese Taipei-CHN	48 ▲
Slovenia	47 ▲
Poland	45 ▲
Lithuania	44 ▲
Australia	44 ▲
Hong Kong-CHN	44 ▲
Italy	43 ▲
Czech Republic	41
Sweden	41
Portugal	40
Singapore	40
England-GBR	39
<b>International average</b>	<b>39</b>
Romania	39
Northern Ireland-GBR	38
Ireland	37
Belgium (Flemish)-BEL	37
New Zealand	36
United Arab Emirates	36
Austria	36
Denmark	35
Georgia	35
Serbia	34 ▼
Saudi Arabia	34 ▼
Netherlands	33 ▼
Oman	32 ▼
Iran, Islamic Rep. of	31 ▼
Thailand	30 ▼
Spain	30 ▼
Bahrain	29 ▼
Armenia	29 ▼
Chile	28 ▼
Norway	28 ▼
Malta	27 ▼
Germany	26 ▼
Qatar	26 ▼
Kuwait	22 ▼
Morocco	21 ▼
Yemen	19 ▼
Tunisia	19 ▼

### Benchmarking education system

North Carolina-USA	51 ▲
Florida-USA	48 ▲
Ontario-CAN	43 ▲
Alberta-CAN	43
Dubai-UAE	39
Abu Dhabi-UAE	34 ▼
Quebec-CAN	29 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Knowing

Item label: Ways to avoid wasting water-DERIVED

There is a shortage of fresh water in many parts of the world. Describe two things people can do to avoid wasting water.

1.

2.

Item Number: S031391Z

### SCORING

Note: Each of the two responses are scored separately. However, if the two responses are essentially the same, the second response should be scored as "Incorrect Response".

#### Correct Response

- Mentions that faucets should not be left running (or similar).  
Example: Don't leave the water running.
- Mentions recycling, reusing or purifying water (or similar).  
Example: Screen out dirt so you can drink the water.
- Mentions a specific practical method to conserve or minimize the use of water.  
Example: Have short showers.
- Other correct

#### Incorrect Response

- Gives a general/vague statement about not using or drinking (much) water. [No specific method given.]  
Example: Stop using water.
- Other incorrect (including crossed out, erased, stray marks, illegible, or off task)

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	70 ▲
Singapore	52 ▲
Chinese Taipei-CHN	51 ▲
Portugal	50 ▲
Australia	42 ▲
<b>United States</b>	<b>41 ▲</b>
Ireland	41 ▲
Hungary	41 ▲
Spain	41 ▲
Belgium (Flemish)-BEL	36 ▲
Netherlands	35 ▲
Bahrain	34 ▲
Iran, Islamic Rep. of	33 ▲
Poland	33 ▲
Italy	33 ▲
Hong Kong-CHN	33 ▲
Germany	32 ▲
Northern Ireland-GBR	31
England-GBR	31
Austria	30
Denmark	29
Finland	29
Japan	28
Sweden	28
Slovak Republic	28
Kazakhstan	28
Chile	27
<b>International average</b>	<b>27</b>
Saudi Arabia	26
Croatia	25
Malta	24
Norway	24
New Zealand	23 ▼
Czech Republic	21 ▼
Serbia	20 ▼
Turkey	20 ▼
Slovenia	18 ▼
Romania	18 ▼
Russian Federation	17 ▼
United Arab Emirates	16 ▼
Qatar	15 ▼
Thailand	15 ▼
Oman	14 ▼
Tunisia	14 ▼
Kuwait	12 ▼
Lithuania	12 ▼
Armenia	9 ▼
Azerbaijan	6 ▼
Morocco	4 ▼
Georgia	2 ▼
Yemen	1 ▼

### Benchmarking education system

Florida-USA	44 ▲
Quebec-CAN	44 ▲
Alberta-CAN	42 ▲
North Carolina-USA	42 ▲
Ontario-CAN	31
Dubai-UAE	27
Abu Dhabi-UAE	13 ▼

- ▲ Percent higher than International average
- ▼ Percent lower than International average

Item label: Ways to avoid wasting water (continued)

S031391Z:

## Student Responses

### Correct Response:

1. Not leaving the facet on,
2. Not taking a 2 hour Shower,

### Incorrect Response:

1. by breaking
2. and spelling it

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Knowing

Item label: Drinking water comes from

Water that has its salt removed before it can be used as drinking water is most likely to have come from

- A. underground
- B. a river
- C. a lake
- D. a sea

Item Number: S041092

**Correct Response:**

**D**

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	88 ▲
Japan	83 ▲
Russian Federation	82 ▲
Chinese Taipei-CHN	76 ▲
Czech Republic	75 ▲
Finland	74 ▲
Sweden	74 ▲
Hong Kong-CHN	73 ▲
Serbia	73 ▲
Slovenia	72 ▲
Hungary	71 ▲
Singapore	71 ▲
Austria	68 ▲
Slovak Republic	68 ▲
Croatia	67 ▲
Netherlands	66 ▲
<b>United States</b>	<b>65 ▲</b>
Northern Ireland-GBR	65 ▲
Norway	64 ▲
England-GBR	63 ▲
Spain	62 ▲
Ireland	61 ▲
Denmark	61
Malta	60
Germany	58
Australia	57
<b>International average</b>	<b>57</b>
Belgium (Flemish)-BEL	57
New Zealand	56
Portugal	55
Chile	55
Saudi Arabia	54
Bahrain	54
Iran, Islamic Rep. of	50 ▼
United Arab Emirates	50 ▼
Georgia	48 ▼
Qatar	48 ▼
Oman	48 ▼
Turkey	45 ▼
Italy	44 ▼
Poland	43 ▼
Lithuania	42 ▼
Thailand	42 ▼
Kuwait	41 ▼
Romania	38 ▼
Morocco	32 ▼
Kazakhstan	31 ▼
Yemen	30 ▼
Tunisia	30 ▼
Armenia	28 ▼
Azerbaijan	21 ▼

### Benchmarking education system

Florida-USA	70 ▲
North Carolina-USA	69 ▲
Alberta-CAN	65 ▲
Quebec-CAN	62 ▲
Ontario-CAN	59
Dubai-UAE	52 ▼
Abu Dhabi-UAE	51 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Processes, Cycles, and History	Knowing

Item label: Reason for direction river flows

The direction water flows in a river depends on

- A. the length of the river
- B. the slope of the land
- C. the type of rock over which the water flows
- D. the location of the North Pole

Item Number: S041100

<b>Correct Response:</b>	<b>B</b>
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**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	81 ▲
Chinese Taipei-CHN	77 ▲
Japan	70 ▲
Hong Kong-CHN	67 ▲
Finland	65 ▲
Sweden	62 ▲
Singapore	58 ▲
Russian Federation	57 ▲
Slovak Republic	57 ▲
Australia	57 ▲
Netherlands	57 ▲
Romania	56 ▲
Czech Republic	56 ▲
Serbia	55 ▲
Italy	55 ▲
Ireland	54 ▲
<b>United States</b>	<b>53 ▲</b>
England-GBR	53 ▲
Germany	51 ▲
New Zealand	51 ▲
Croatia	51 ▲
Northern Ireland-GBR	51
Hungary	51 ▲
Austria	49
Norway	48
Spain	47
Kazakhstan	47
Georgia	46
<b>International average</b>	<b>45</b>
Poland	44
Denmark	44
Belgium (Flemish)-BEL	44
Portugal	39 ▼
Armenia	38 ▼
Turkey	35 ▼
Lithuania	35 ▼
Iran, Islamic Rep. of	34 ▼
Slovenia	34 ▼
Saudi Arabia	30 ▼
Thailand	29 ▼
United Arab Emirates	28 ▼
Bahrain	27 ▼
Malta	26 ▼
Chile	25 ▼
Kuwait	25 ▼
Azerbaijan	25 ▼
Qatar	24 ▼
Yemen	24 ▼
Oman	24 ▼
Tunisia	22 ▼
Morocco	20 ▼

**Benchmarking education system**

Alberta-CAN	58 ▲
North Carolina-USA	54 ▲
Florida-USA	50
Ontario-CAN	47
Quebec-CAN	45
Dubai-UAE	35 ▼
Abu Dhabi-UAE	24 ▼

▲ Percent higher than International average  
▼ Percent lower than International average



Content Domain	Main Topic	Cognitive Domain
EARTH SCIENCE	Earth in the Solar System	Knowing

Item label: Energy received from the sun

Write down one form of energy Earth receives from the Sun.

### Overall Percent Correct

Education system	Percent correct
Singapore	82 ▲
Korea, Rep. of	79 ▲
Slovak Republic	75 ▲
Hong Kong-CHN	73 ▲
Russian Federation	73 ▲
Northern Ireland-GBR	69 ▲
Netherlands	69 ▲
Italy	68 ▲
Romania	68 ▲
Ireland	68 ▲
England-GBR	66 ▲
Austria	64 ▲
Australia	63 ▲
<b>United States</b>	<b>63 ▲</b>
Kazakhstan	62 ▲
Portugal	62 ▲
Croatia	62 ▲
Serbia	61 ▲
Chinese Taipei-CHN	61 ▲
Denmark	61 ▲
Japan	59 ▲
Czech Republic	59 ▲
Georgia	59
Belgium (Flemish)-BEL	59 ▼
Norway	57
New Zealand	56
Turkey	55
Finland	55
<b>International average</b>	<b>54</b>
Hungary	54
Iran, Islamic Rep. of	54
Slovenia	53
Chile	53
Lithuania	53
Thailand	52
Spain	51
Germany	48 ▼
Bahrain	47 ▼
Saudi Arabia	47 ▼
United Arab Emirates	46 ▼
Poland	45 ▼
Sweden	44 ▼
Qatar	40 ▼
Malta	38 ▼
Azerbaijan	37 ▼
Armenia	35 ▼
Kuwait	29 ▼
Tunisia	29 ▼
Oman	24 ▼
Yemen	12 ▼
Morocco	9 ▼

### Benchmarking education system

Florida-USA	67 ▲
Alberta-CAN	64 ▲
North Carolina-USA	62 ▲
Ontario-CAN	60 ▲
Quebec-CAN	57
Dubai-UAE	56
Abu Dhabi-UAE	44 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item Number: S041110

### SCORING

#### Correct Response

- Refers to light (sunlight).  
Example: Light energy.
- Refers to heat.  
Example: It provides heat.
- Refers to solar energy.  
Example: Solar energy.

#### Incorrect Response

- Incorrect (including crossed out, erased, stray marks, illegible, or off task)
- Examples:  
Energy from the sun.  
Sun.

Item label: Energy received from the sun (continued)

S041110:

## Student Responses

### Correct Response:

light

### Incorrect Response:

The sun gives light so people  
can see on earth

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Applying

Item label: Advantage to farming by a river

The picture below shows a river flowing across a plain.



Farming is carried out on the plain and near the river.

There are advantages and disadvantages to farming along a river.

A. Describe one **advantage**.

Item Number: S041201A

### SCORING

#### Correct Response

- Refers to the availability of water (for crops and/or animals) OR presence of fertile soil OR ability to grow better crops.

Examples:

Lots of water for irrigation.

They can water their crops easily.

You would be able to get water for animals.

#### Incorrect Response

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

Examples:

Having enough water for washing.

You can catch fish.

The crops will grow.

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	83 ▲
Finland	70 ▲
Singapore	62 ▲
Portugal	61 ▲
Chinese Taipei-CHN	61 ▲
Czech Republic	59 ▲
Italy	57 ▲
Thailand	57 ▲
Germany	55 ▲
Russian Federation	54 ▲
Hong Kong-CHN	54 ▲
Austria	54 ▲
Romania	53 ▲
Sweden	53 ▲
England-GBR	52 ▲
Northern Ireland-GBR	52 ▲
Denmark	51 ▲
Netherlands	51 ▲
Ireland	51 ▲
Lithuania	50 ▲
<b>United States</b>	<b>49 ▲</b>
Iran, Islamic Rep. of	48 ▲
Belgium (Flemish)-BEL	44
Poland	44
Australia	44
Croatia	43
Kazakhstan	43
<b>International average</b>	<b>42</b>
Norway	41
Slovenia	39
Slovak Republic	38
New Zealand	38 ▼
Serbia	38
Hungary	37 ▼
Turkey	36 ▼
Spain	35 ▼
Chile	35 ▼
Georgia	35 ▼
Japan	33 ▼
Bahrain	29 ▼
Azerbaijan	28 ▼
United Arab Emirates	27 ▼
Malta	26 ▼
Saudi Arabia	25 ▼
Qatar	23 ▼
Armenia	22 ▼
Tunisia	16 ▼
Kuwait	13 ▼
Oman	13 ▼
Morocco	13 ▼
Yemen	3 ▼

### Benchmarking education system

Alberta-CAN	59 ▲
Ontario-CAN	54 ▲
Quebec-CAN	43
Florida-USA	38
Dubai-UAE	37 ▼
North Carolina-USA	35 ▼
Abu Dhabi-UAE	19 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Item label: Advantage to farming by a river (continued)

S041201A:

## Student Responses

### Correct Response:

The river is  
helping the plants  
grow

### Incorrect Response:

The farm

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Applying

Item label: Disadvantage to farming by a river

The picture below shows a river flowing across a plain.



Farming is carried out on the plain and near the river.

There are advantages and disadvantages to farming along a river.

B. Describe one **disadvantage**.

Item Number: S041201B

### SCORING

#### Correct Response

- Refers to the river flooding/overflowing OR the river being polluted/carrying pollutants OR animals falling into the river.

Examples:

The river could flood.

Pollutions can flow from the fields down into the river.

The water may be poisoned.

#### Incorrect Response

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

Examples:

In the winter the water freezes over and you go skating and fall in.

Something will fall into the water.

The river is dangerous.

### Overall Percent Correct

Education system	Percent correct
Korea, Rep. of	64 ▲
Czech Republic	60 ▲
Italy	55 ▲
Finland	55 ▲
Slovak Republic	55 ▲
Romania	53 ▲
Thailand	52 ▲
Chinese Taipei-CHN	52 ▲
Netherlands	52 ▲
Slovenia	51 ▲
Singapore	49 ▲
Austria	47 ▲
Ireland	46 ▲
Germany	46 ▲
Hong Kong-CHN	45 ▲
Denmark	44 ▲
Poland	44 ▲
Portugal	44 ▲
Hungary	43 ▲
Northern Ireland-GBR	43 ▲
England-GBR	43 ▲
Russian Federation	42 ▲
Belgium (Flemish)-BEL	39 ▲
New Zealand	38
Australia	36
<b>United States</b>	<b>35</b>
Lithuania	34
<b>International average</b>	<b>34</b>
Sweden	33
Turkey	32
Georgia	29
Japan	26 ▼
Kazakhstan	25 ▼
Azerbaijan	25 ▼
Norway	25 ▼
Spain	24 ▼
Serbia	24 ▼
Chile	23 ▼
Croatia	22 ▼
Iran, Islamic Rep. of	22 ▼
Malta	16 ▼
Bahrain	15 ▼
Armenia	15 ▼
United Arab Emirates	14 ▼
Qatar	13 ▼
Saudi Arabia	11 ▼
Oman	7 ▼
Tunisia	7 ▼
Morocco	6 ▼
Kuwait	5 ▼
Yemen	1 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	42 ▲
Ontario-CAN	36
Quebec-CAN	35
North Carolina-USA	25 ▼
Florida-USA	24 ▼
Dubai-UAE	21 ▼
Abu Dhabi-UAE	9 ▼

▲ Percent higher than International average

▼ Percent lower than International average

Item label: Disadvantage to farming by a river (continued)

S041201B:

## Student Responses

### Correct Response:

The river might be  
dirty

### Incorrect Response:

The mountain's

Content Domain	Main Topic	Cognitive Domain
EARTH SCIENCE	Earth in the Solar System	Knowing

Item label: How often Earth rotates on axis

How often does Earth rotate on its axis?

A. once every 12 hours

B. once every 24 hours

C. once every month

D. once every year

Item Number: S041208

Correct Response:	<b>B</b>
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### Overall Percent Correct

Education system	Percent correct
Slovak Republic	70 ▲
Portugal	69 ▲
Bahrain	69 ▲
Slovenia	67 ▲
Lithuania	67 ▲
Spain	66 ▲
Turkey	65 ▲
Saudi Arabia	65 ▲
Georgia	64 ▲
Kazakhstan	63 ▲
Iran, Islamic Rep. of	63 ▲
Azerbaijan	59 ▲
Romania	59 ▲
Qatar	59 ▲
United Arab Emirates	59 ▲
Japan	58 ▲
Chile	58 ▲
Austria	57 ▲
Russian Federation	57
Hungary	55
Germany	54
Thailand	54
Italy	53
<b>International average</b>	<b>53</b>
Oman	53
Belgium (Flemish)-BEL	53
<b>United States</b>	<b>52</b>
Netherlands	52
Korea, Rep. of	52
Czech Republic	51
Serbia	51
Croatia	50
Poland	49
England-GBR	49
Denmark	48 ▼
Norway	47 ▼
Chinese Taipei-CHN	47 ▼
Hong Kong-CHN	46 ▼
Finland	45 ▼
Singapore	45 ▼
New Zealand	44 ▼
Australia	44 ▼
Armenia	44 ▼
Malta	43 ▼
Sweden	42 ▼
Ireland	42 ▼
Northern Ireland-GBR	42 ▼
Morocco	39 ▼
Kuwait	37 ▼
Yemen	37 ▼
Tunisia	36 ▼

### Benchmarking education system

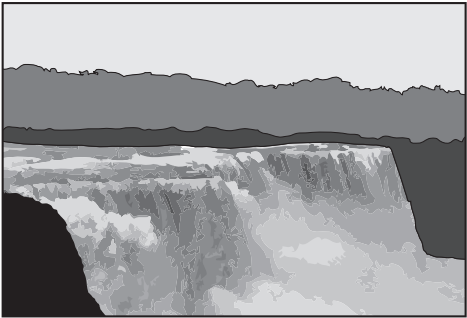
Dubai-UAE	59 ▲
Abu Dhabi-UAE	57
Florida-USA	55
Quebec-CAN	51
North Carolina-USA	46 ▼
Alberta-CAN	44 ▼
Ontario-CAN	41 ▼

▲ Percent higher than International average  
▼ Percent lower than International average

Content Domain	Main Topic	Cognitive Domain
<b>EARTH SCIENCE</b>	Earth's Structure, Physical Characteristics, and Resources	Knowing

Item label: Which made from waterfall energy

A river flowing over a waterfall has a lot of energy.



Which of the following is made from waterfall energy?

- A. hot water
- B. solar power
- C. electricity
- D. drinking water

Item Number: S051100

<b>Correct Response:</b>	<b>C</b>
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**Overall Percent Correct**

Education system	Percent correct
Austria	72 ▲
Serbia	68 ▲
Germany	63 ▲
Finland	59 ▲
Romania	56 ▲
Croatia	54 ▲
Iran, Islamic Rep. of	52 ▲
Norway	51 ▲
Sweden	50 ▲
Azerbaijan	49 ▲
Korea, Rep. of	47 ▲
Italy	42 ▲
Hong Kong-CHN	41 ▲
Czech Republic	41 ▲
Russian Federation	34
Portugal	33
Thailand	33
<b>International average</b>	<b>31</b>
Hungary	31
Netherlands	31
Slovenia	31
Kazakhstan	30
Georgia	29
Denmark	29
Armenia	29
Poland	28
Lithuania	28
Belgium (Flemish)-BEL	28
Spain	28
Japan	26 ▼
Turkey	25 ▼
Slovak Republic	24 ▼
New Zealand	24 ▼
Ireland	24 ▼
Chinese Taipei-CHN	21 ▼
Chile	19 ▼
Qatar	19 ▼
<b>United States</b>	<b>19 ▼</b>
Singapore	17 ▼
United Arab Emirates	16 ▼
Yemen	15 ▼
Morocco	15 ▼
Bahrain	14 ▼
Tunisia	14 ▼
England-GBR	13 ▼
Oman	13 ▼
Northern Ireland-GBR	12 ▼
Australia	12 ▼
Saudi Arabia	12 ▼
Malta	10 ▼
Kuwait	—

**Benchmarking education system**

Quebec-CAN	42 ▲
Ontario-CAN	28
Alberta-CAN	25 ▼
North Carolina-USA	21 ▼
Dubai-UAE	19 ▼
Florida-USA	17 ▼
Abu Dhabi-UAE	12 ▼

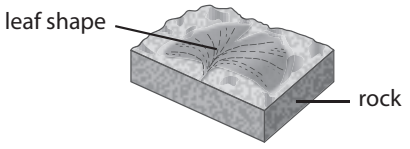
▲ Percent higher than International average  
 ▼ Percent lower than International average  
 — Not applicable



Content Domain	Main Topic	Cognitive Domain
EARTH SCIENCE	Earth's Processes, Cycles, and History	Knowing

Item label: How long ago was plant alive?

The leaf shape in the rock comes from a plant that lived long ago.



leaf shape

rock

About how long ago was the plant alive?

- A. one year
- B. one hundred years
- C. one thousand years
- D. one million years

Item Number: S051156

<b>Correct Response:</b>	<b>D</b>
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**Overall Percent Correct**

Education system	Percent correct
Korea, Rep. of	64 ▲
Germany	42 ▲
Slovak Republic	42 ▲
Czech Republic	40 ▲
Austria	40 ▲
Italy	40 ▲
Japan	39 ▲
Georgia	36 ▲
Chinese Taipei-CHN	35 ▲
Norway	35 ▲
Sweden	35 ▲
Spain	34 ▲
Hong Kong-CHN	34 ▲
<b>United States</b>	<b>33 ▲</b>
Slovenia	32 ▲
Singapore	32 ▲
Finland	31
Hungary	31
Denmark	31
Kuwait	30
Poland	30
Russian Federation	29
Azerbaijan	28
<b>International average</b>	<b>28</b>
England-GBR	27
Romania	26
Australia	26
Ireland	25
New Zealand	25
Malta	25
United Arab Emirates	24 ▼
Croatia	23 ▼
Kazakhstan	23 ▼
Qatar	23 ▼
Chile	22 ▼
Serbia	22 ▼
Iran, Islamic Rep. of	21 ▼
Portugal	21 ▼
Armenia	21 ▼
Thailand	21 ▼
Turkey	20 ▼
Northern Ireland-GBR	20 ▼
Oman	20 ▼
Saudi Arabia	19 ▼
Tunisia	19 ▼
Yemen	18 ▼
Morocco	17 ▼
Belgium (Flemish)-BEL	17 ▼
Bahrain	16 ▼
Lithuania	16 ▼
Netherlands	15 ▼
<b>Benchmarking education system</b>	
Alberta-CAN	43 ▲
Florida-USA	36 ▲
Quebec-CAN	32
Ontario-CAN	31 ▲
North Carolina-USA	29
Dubai-UAE	28
Abu Dhabi-UAE	22 ▼

▲ Percent higher than International average  
▼ Percent lower than International average