

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS



TIMSS 2007 User Guide for the International Database

Released Items

Science – Fourth Grade



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International Study Center
Lynch School of Education, Boston College

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TIMSS 2007 User Guide for the International Database

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Item ID	Subject	Grade	Block	Block Seq	Content Domain	Cognitive Domain	Maximum Points	Key
SP31446	S	4	S01	01				
S031446A	S	4	S01	01	Physical Science	Reasoning	1	See scoring guide
S031446B	S	4	S01	01	Physical Science	Reasoning	1	See scoring guide
S031446C	S	4	S01	01	Physical Science	Reasoning	1	See scoring guide
S031445A	S	4	S01	02	Physical Science	Reasoning	1	See scoring guide
S031445B	S	4	S01	02	Physical Science	Reasoning	1	See scoring guide
S031447	S	4	S01	03	Physical Science	Reasoning	2	See scoring guide
S031193	S	4	S01	04	Life Science	Applying	1	C
S031264	S	4	S01	05	Life Science	Applying	1	A
S031347	S	4	S01	06	Life Science	Applying	1	C
S031346	S	4	S01	07	Life Science	Reasoning	1	See scoring guide
S031081	S	4	S01	08	Earth Science	Applying	1	See scoring guide
S041007	S	4	S02	01	Life Science	Applying	1	B
S041164	S	4	S02	02	Life Science	Knowing	1	B
S041018	S	4	S02	03	Life Science	Knowing	2	See scoring guide
S041160	S	4	S02	04	Life Science	Knowing	1	D
S041042	S	4	S02	05	Life Science	Knowing	1	A
S041079	S	4	S02	06	Physical Science	Reasoning	1	A
S041073	S	4	S02	07	Physical Science	Applying	1	See scoring guide
S041217	S	4	S02	08	Physical Science	Reasoning	1	D
S041196	S	4	S02	09	Physical Science	Knowing	1	C
S041211	S	4	S02	10	Physical Science	Applying	1	See scoring guide
S041051	S	4	S02	11	Physical Science	Applying	1	B
S041089	S	4	S02	12	Earth Science	Knowing	1	C
S041156A	S	4	S02	13	Earth Science	Applying	1	C
S041156B	S	4	S02	13	Earth Science	Applying	1	See scoring guide
S031229	S	4	S03	01	Life Science	Knowing	1	B
S031270	S	4	S03	02	Life Science	Reasoning	1	See scoring guide
S031026	S	4	S03	03	Life Science	Reasoning	2	See scoring guide
S031319	S	4	S03	04	Life Science	Knowing	1	C
S031414A	S	4	S03	05	Physical Science	Knowing	1	See scoring guide
S031414B	S	4	S03	05	Physical Science	Knowing	1	See scoring guide
S031078	S	4	S03	06	Physical Science	Reasoning	1	A
S031009	S	4	S03	07	Physical Science	Applying	1	See scoring guide
S031401	S	4	S03	08	Earth Science	Applying	1	B
S031384A	S	4	S03	09	Earth Science	Knowing	1	See scoring guide
S031384B	S	4	S03	09	Earth Science	Applying	1	See scoring guide
S041165	S	4	S04	01	Life Science	Knowing	1	B
S041023	S	4	S04	02	Life Science	Knowing	1	See scoring guide
S041047	S	4	S04	03	Life Science	Applying	1	A
S041001	S	4	S04	04	Life Science	Applying	2	See scoring guide
S041029	S	4	S04	05	Life Science	Reasoning	1	See scoring guide
S041054	S	4	S04	06	Physical Science	Applying	1	B
S041308	S	4	S04	07	Physical Science	Knowing	1	D
S041179	S	4	S04	08	Life Science	Reasoning	1	See scoring guide
S041087	S	4	S04	09	Earth Science	Applying	1	A
S041205	S	4	S04	10	Earth Science	Applying	1	D
S041216	S	4	S04	11	Physical Science	Applying	1	See scoring guide
S041061	S	4	S04	12	Physical Science	Applying	1	See scoring guide
S041202	S	4	S04	13	Earth Science	Knowing	2	See scoring guide
S041215	S	4	S04	14	Earth Science	Applying	1	C
S031255	S	4	S05	01	Life Science	Knowing	1	B

Item ID	Subject	Grade	Block	Block Seq	Content Domain	Cognitive Domain	Maximum Points	Key
S031240	S	4	S05	02	Life Science	Knowing	2	See scoring guide
S031239	S	4	S05	03	Life Science	Knowing	1	A
S031235A	S	4	S05	04	Life Science	Applying	1	See scoring guide
S031235B	S	4	S05	04	Life Science	Applying	1	See scoring guide
S031205	S	4	S05	05	Physical Science	Knowing	1	C
S031399A	S	4	S05	06	Physical Science	Applying	1	See scoring guide
S031399B	S	4	S05	06	Physical Science	Applying	1	See scoring guide
S031393	S	4	S05	07	Earth Science	Knowing	1	See scoring guide
S031278	S	4	S05	08	Earth Science	Knowing	1	See scoring guide
S031317	S	4	S07	01	Life Science	Knowing	1	B
S031190	S	4	S07	02	Life Science	Reasoning	1	See scoring guide
S031431	S	4	S07	03	Life Science	Reasoning	1	C
S031283	S	4	S07	04	Life Science	Knowing	1	C
S031426	S	4	S07	05	Life Science	Reasoning	1	D
S031422	S	4	S07	06	Physical Science	Knowing	1	C
S031427	S	4	S07	07	Physical Science	Applying	1	B
S031075	S	4	S07	08	Physical Science	Applying	1	A
S031047	S	4	S07	09	Earth Science	Reasoning	1	See scoring guide
S031387	S	4	S07	10	Earth Science	Applying	1	C
S031396	S	4	S07	11	Earth Science	Knowing	2	See scoring guide

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Science

Fourth Grade

Emile and Andre went to a clothing store to buy an orange shirt. On the way home, they opened up their bag to show a friend the new orange shirt. They were surprised to see that the shirt looked red instead of orange.



In the store



On the way home

Emile thought they were given the wrong shirt, but Andre thought the color of the shirt just looked different because sunlight is different from store lighting. They decided to do an investigation to see who was right.

SP31446

Questions for Light and Color begin on the next page. ➡

Content Domain

Cognitive Domain

Maximum Points

Key

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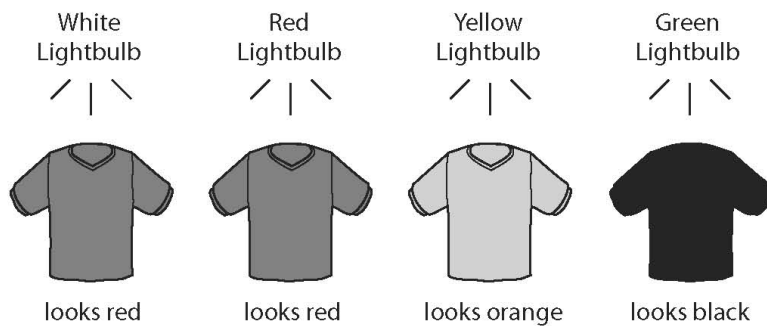
Science

Fourth Grade

Investigation of the New Shirt

Emile and Andre got a lamp and four colored lightbulbs – a white bulb, a red bulb, a yellow bulb, and a green bulb. They took the new shirt they had just bought and looked at it under the different lightbulbs. The pictures below show what they saw.

The New Shirt Seen Under Different Colored Lightbulbs



A. Describe the results of Emile's and Andre's investigation of the new shirt.

Content Domain

Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

This Light and Color question continues on the next page. ➡

Note: To receive credit, responses must explicitly refer to *color* change in the shirt. Credit is given both for responses that describe the results (Code 10) as well as those that draw a correct conclusion based on the results that refers to the color of the shirt under different light sources (Code 11). Responses that draw an incorrect conclusion not directly tied to the results of the investigation are scored as incorrect (Code 71). Responses that give a literal description of what is shown in the diagram must describe enough conditions to indicate a change in color for Code 10. Responses that describe only one color are given Code 79.

Code	Response	Item: S031446A
	Correct Response	
10	Describes that the color of the shirt changed (under the different colored light bulbs). <i>Examples:</i> <i>Because of the changes in the light source the color of the shirt changed.</i> <i>They saw the shirt as different colors as the lightbulb changed.</i> <i>The color of the shirt changed under the different bulbs.</i> <i>The color of the shirt depends on the light source.</i> <i>The shirt looked red in white and red light, it looked orange in yellow light, and black in green light.</i>	
11	Draws a correct conclusion based on the results of the investigation. <i>Examples:</i> <i>The sun must be white light because the shirt looks red under the white lightbulb.</i> <i>The reason the shirt looked orange is because the store light is yellow.</i>	
19	Other correct	
	Incorrect Response	
70	States a change in the shirt or its appearance but does NOT explicitly mention color. <i>Examples:</i> <i>It looked different as the lightbulb changed.</i> <i>The pattern changed.</i> <i>Different colors make different results.</i> <i>It is dark under the green bulb and light under the yellow bulb.</i>	
71	Draws a conclusion not directly connected to the results of the investigation. <i>Examples:</i> <i>The shirt must be orange.</i> <i>I think the shirt is supposed to be red.</i> <i>They got an orange shirt but it was really red.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples:</i> <i>The shirt looked red under both white and red light.</i> <i>Under the yellow light it was an orange shirt.</i>	
	Nonresponse	
99	Blank	

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Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

B. Were Emile and Andre given the wrong shirt at the store?

(Check one box.)

☐ Yes☐ No

Explain your answer using the results of their investigation.

C. What color was the lightbulb in the store?

Answer: _____

Questions for Light and Color continue. ➡

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Note: To receive credit, responses must indicate NO with an explanation that is connected to the results of the investigation (color of the shirt appears different under different light sources).

Code	Response	Item: S031446B
	Correct Response	
10	NO with an explanation based on the effect of the light source. <i>Examples:</i> <i>No. The shirt looks different under different lights. It is red in white light and sunlight. It looks orange in yellow light.</i> <i>No. The color of the shirt changed because of the light.</i> <i>The sunlight made it look a different color.</i>	
19	Other correct	
	Incorrect Response	
70	NO with no explanation or an incorrect explanation. [May include a true statement based on information given elsewhere in the task but is not adequately connected to the effect of the light source.] <i>Examples:</i> <i>No. It just looked different.</i> <i>No. It is the same shirt only darker.</i> <i>No. When they were outside it was red.</i>	
71	YES with or without explanation. <i>Examples:</i> <i>Yes. It looked red.</i> <i>Yes. Because it was a yellow light bulb.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Fourth Grade****Content Domain**

Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

B. Were Emile and Andre given the wrong shirt at the store?

(Check one box.)

☐ Yes

☐ No

Explain your answer using the results of their investigation.

C. What color was the lightbulb in the store?

Answer: _____

Questions for Light and Color continue. ➡

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Code	Response	Item: S031446C
	Correct Response	
10	Yellow	
	Incorrect Response	
70	White	
71	Orange	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

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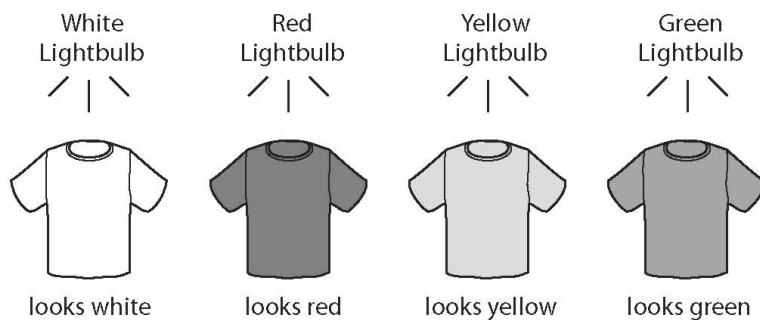
Science

Fourth Grade

Investigation of a White Shirt

Emile and Andre wondered how shirts of other colors would look under different lights. They took a white shirt and looked at it under each lightbulb. The pictures below show what they saw.

The White Shirt Seen Under Different Colored Lightbulbs



A. Describe the results of Emile's and Andre's investigation of the white shirt.

B. What color do you think the white shirt would look under a blue lightbulb?

Answer: _____

Questions for Light and Color continue. ➡

Content Domain
Physical Science

Cognitive Domain
Reasoning

Maximum Points

1

Key

See scoring guide

Note: To receive credit, responses must refer to *color* change in the shirt as a result of the different light sources (the shirt appears the same color as the lightbulb or is a different color under the different lightbulbs). Responses that give a literal description of what is shown in the diagram must describe at least two of the conditions to indicate a change in color for Code 10. Responses that describe only one color are given Code 79.

Code	Response	Item: S031445A
	Correct Response	
10	Describes that the color of the shirt changed (under the different colored lightbulbs). <i>Examples:</i> <i>Since it was a white shirt it showed the color of the light bulb.</i> <i>They saw it change color to what the light bulb was colored.</i> <i>The shirt looked white in white light, red in red, yellow in yellow, and green in green light.</i> <i>When the light changed the color of the shirt changed.</i> <i>They saw the shirt change color each time.</i>	
19	Other correct	
	Incorrect Response	
70	States a change in the shirt or its appearance but does NOT explicitly mention color. <i>Examples:</i> <i>They saw it change again.</i> <i>It got darker.</i> <i>It looked different each time.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples:</i> <i>The shirt looked yellow under the yellow light.</i>	
	Nonresponse	
99	Blank	

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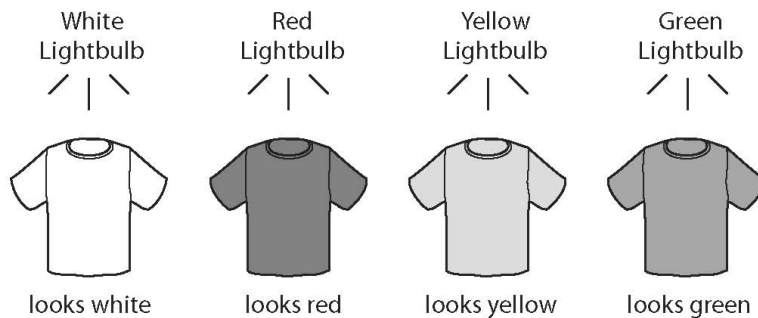
Science

Fourth Grade

Investigation of a White Shirt

Emile and Andre wondered how shirts of other colors would look under different lights. They took a white shirt and looked at it under each lightbulb. The pictures below show what they saw.

The White Shirt Seen Under Different Colored Lightbulbs



A. Describe the results of Emile's and Andre's investigation of the white shirt.

B. What color do you think the white shirt would look under a blue lightbulb?

Answer: _____

Questions for Light and Color continue. ➡

Content Domain

Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide



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Code	Response	Item: S031445B
	Correct Response	
10	Blue	
	Incorrect Response	
79	Incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

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Fourth Grade

Content Domain

Physical Science

Cognitive Domain

Reasoning

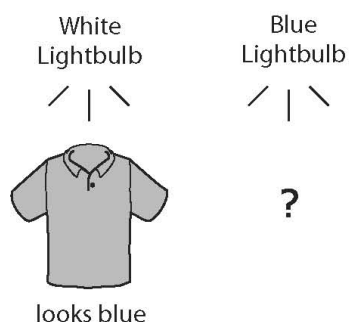
Maximum Points

2

Key

See scoring guide

Emile and Andre then took another shirt. It looked blue under the white lightbulb.



What color do you think the shirt would look under a blue lightbulb?

Answer: _____

Explain your answer using the results of Emile's and Andre's investigations.

S031447

End of Light and Color section. ●

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Note: For full credit, responses must write BLUE (light/dark blue, etc.) with a correct explanation based on the results of the investigations. Credit will be given both for responses that include a correct comparison of the color of the shirt in white versus blue light as well as those that refer to the light being the same color as the shirt (reflects a generalization of results from the previous investigation in the task – red shirt appears red under red light). Partial credit is given for writing BLUE with no explanation (Code 10) or an explanation that is not adequately or correctly linked to the results of the investigations (Code 11).

Code	Response	Item: S031447
	Correct Response	
20	BLUE with an explanation based on the results of the investigations. Includes a correct comparison of the shirt color under white versus blue light or refers to the light source being the same color as the shirt (or similar). <i>Examples:</i> <i>Blue. If the shirt looks blue in white light, it will also look blue in blue light because that is the same color of light as the shirt.</i> <i>Blue. Like with the red shirt under the red light.</i> <i>Blue. Under white light it looked blue, so that is the true color of the shirt. Under blue light it will still look blue.</i> <i>Blue. A blue shirt under a blue light would be blue.</i>	
29	Other fully correct	
	Partial Response	
10	BLUE with no explanation.	
11	BLUE with an inadequate explanation. [Inadequate/incorrect comparison of the results under white/blue lights or reference to the light being the same color as the shirt.] <i>Examples:</i> <i>Blue. The white light is always the right color.</i> <i>Blue. Because the shirt is blue.</i> <i>Blue. If you mix blue and blue you get blue.</i> <i>Blue. It depends on what the light is.</i>	
19	Other partially correct	
	Incorrect Response	
70	WHITE with or without explanation. <i>Examples:</i> <i>White. The light changes the color of the shirt.</i> <i>White. Because of the sun.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task) <i>Examples:</i> <i>Whitish blue.</i>	
	Nonresponse	
99	Blank	

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Which of these animals has teeth that are most like the teeth of humans?

- Ⓐ deer
- Ⓑ lion
- Ⓒ monkey
- Ⓓ dog

S031193

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

C

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TIMSS2007**Science****Fourth Grade**

S031264

Some people have straight hair and some have curly hair. What decides whether a person will be born with curly hair or straight hair?

- Ⓐ the type of hair their parents have
- Ⓑ the type of hair their brothers and sisters have
- Ⓒ their hair color
- Ⓓ their skin color

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

A

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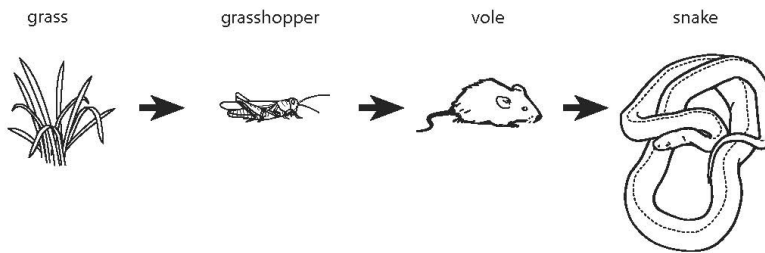


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Science

Fourth Grade



Which statement about the food chain shown above is correct?

- (A) Voles eat grasshoppers and grass.
- (B) Grasshoppers eat grass and voles.
- (C) Snakes eat voles.
- (D) Snakes eat grass.

S031347

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

C

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TIMSS2007**Science****Fourth Grade****Content Domain**

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

Greg tells his friend Sophia that he can get all the nutrients he needs to stay healthy from fruit. Sophia thinks that Greg will need to eat other types of food as well.

Who is correct?

(Check one box.)

☐

Greg

☐

Sophia

Explain your answer.

S031346

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Note: Credit is given both for responses that mention specific *foods* (or food groups) needed for a balanced diet (Code 10) as well as responses that refer to specific *nutrients* not obtained from a diet of only fruit (Code 11). Responses that only repeat information given in the stem (needing to eat other types of food or only eating fruit not being healthy, etc.) are scored as incorrect. Responses are scored primarily on their explanation. If the explanation is correct, credit is given even if the student checks GREG (Code 12), indicating some confusion about the position of Greg and Sophia.

Code	Response	Item: S031346
	Correct Response	
10	SOPHIA with an explanation that identifies other specific <i>foods</i> (or food groups) that Greg needs to eat. <i>Examples:</i> <i>Vegetables, meat, fish, eggs, beans, rice, grains, dairy products, etc.</i>	
11	SOPHIA with an explanation that identifies specific <i>nutrients</i> that are lacking in a diet of only fruit. <i>Examples:</i> <i>You need to eat different foods to get all your vitamins.</i> <i>You need some protein to keep healthy.</i>	
12	GREG with a correct explanation. <i>Examples:</i> <i>He needs to eat foods from all four food groups for a healthy diet.</i>	
19	Other correct	
	Incorrect Response	
70	SOPHIA with no explanation or an incorrect explanation. [Includes responses that only repeat information in the stem or make a true statement that does not answer the question.] <i>Examples:</i> <i>Other types of food are also needed for good health.</i> <i>Too much fruit is bad for you.</i> <i>I just think Sophia is right.</i> <i>He needs other food for nutrients.</i>	
71	GREG with no explanation or an incorrect explanation. [Includes responses that only repeat information in the stem or make a true statement that does not answer the question.] <i>Examples:</i> <i>Fruit contains lots of vitamins.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

S031081

A ribbon is tied to a pole to measure the wind strength as shown below.

1 2 3 4

Write the numbers 1, 2, 3, and 4 in the correct order that shows the wind strength from the **strongest** to **weakest**.

Answer : _____, _____, _____, _____

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Science Fourth Grade

Content Domain
Earth Science

Cognitive Domain
Applying

Maximum Points
1

Key
See scoring guide

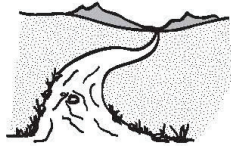
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Code	Response	Item: S031081
	Correct Response	
10	3, 4, 1, 2	
	Incorrect Response	
70	2, 1, 4, 3 (reverse order)	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

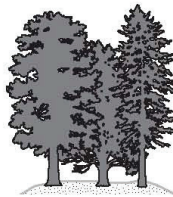
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Science
Fourth Grade

Look at the four pictures.



river



trees



seeds



fire

Which pictures show **non-living** things?

- (A) trees and fire
- (B) fire and river
- (C) river and seeds
- (D) seeds and trees

S041007

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Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

B



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Science Fourth Grade

Content Domain
Life Science
Cognitive Domain
Knowing
Maximum Points
1
Key
B

An animal has six legs.

What is it most likely to be?

- (A) a spider
- (B) a fly
- (C) a lizard
- (D) a centipede

S041164

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Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

2

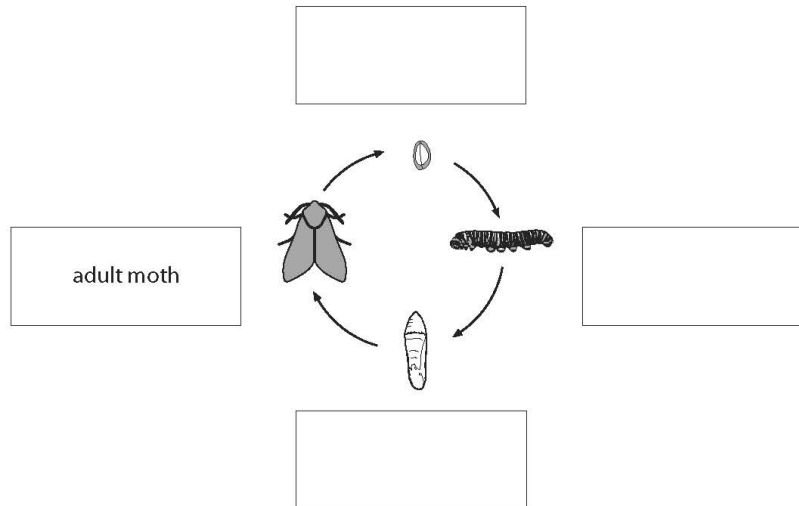
Key

See scoring guide

The diagram below shows the life cycle of a moth.

Write the name of each stage in the boxes provided.

One stage has been completed for you.



S041018

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Code	Response	Item: S041018
	Correct Response	
20	Names three stages correctly: <div> <div>egg</div> <div> </div> <div>adult moth</div> <div>caterpillar or larva</div> <div>chrysalis, chrysalid, pupa, or cocoon</div> </div>	
	Partially Correct Response	
10	Names one or two stages correctly.	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Fourth Grade**

Where do plants get energy from to make food?

- Ⓐ air
- Ⓑ soil
- Ⓒ water
- Ⓓ sunlight

S041160

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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TIMSS2007**Science****Fourth Grade****Content Domain**

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

A

Smoking harms the body in many ways.

It is most harmful to which organ?

- Ⓐ lung
- Ⓑ kidney
- Ⓒ liver
- Ⓓ stomach

S041042

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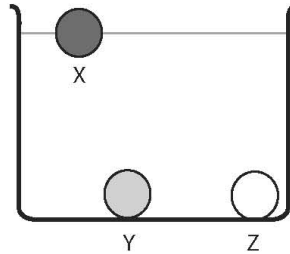
TIMSS2007

Science

Fourth Grade

Tom has three objects that are the same shape and size.

Tom puts the three objects in a beaker of water. He observes that X floats, but Y and Z both sink.



What can he tell about the weight of object X compared to Y and Z?

- (A) X is lighter than Y or Z.
- (B) X is heavier than Y or Z.
- (C) X is lighter than Y and heavier than Z.
- (D) X is heavier than Y and lighter than Z.

S041079

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Content Domain

Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

A



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TIMSS2007

Science

Fourth Grade

Content Domain

Physical Science

Cognitive Domain

Applying

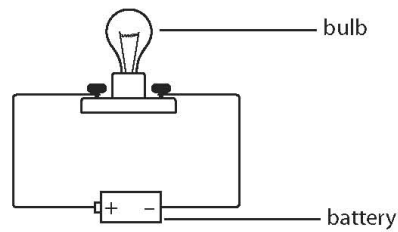
Maximum Points

1

Key

See scoring guide

The bulb in the circuit shown below does NOT light up.



One possible reason is that the bulb is broken.

Give another possible reason for the bulb not lighting.

S041073

Code	Response	Item: S041073
	Correct Response	
10	Mentions that the battery may not be working. <i>Examples:</i> <i>The battery has no energy left.</i> <i>There is not enough volts in the battery.</i> <i>The battery is flat.</i> <i>The battery may be dead.</i> <i>The battery might be weak.</i> <i>The battery is not working.</i> <i>It needs more batteries.</i> <i>It needs a second battery.</i> <i>Maybe the power is not strong enough.</i>	
11	Mentions that the circuit is not complete. <i>Examples:</i> <i>One of the wires may be loose.</i> <i>There is a cut in the wire.</i> <i>The battery may not be connected properly.</i> <i>The bulb may be loose.</i> <i>The bulb wasn't screwed in right.</i>	
	Incorrect Response	
70	Mentions that the battery is put in the wrong way round. <i>Examples:</i> <i>I think that the + side of the battery was put on the - side of the battery causing the bulb not to get energy.</i>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task) <i>Examples:</i> <i>The wires are not good.</i> <i>The bulb is bad.</i> <i>The battery is not in all the way.</i> <i>The battery is not put in properly.</i>	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

Katie has a mixture of iron filings and sand. She wants to separate them.

How can she do this?

- (A) Shake the mixture, and the iron filings will rise to the surface.
- (B) Add water to the mixture, and the sand will dissolve in the water.
- (C) Put the mixture through a sieve, and the sand will remain in the sieve.
- (D) Pass a magnet over the mixture, and the magnet will attract the iron filings.

S041217

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S041196

Which of the following runs ONLY on electricity?

- (A) a sailboat
- (B) a motorcycle
- (C) a ceiling fan
- (D) a steam engine

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TIMSS2007

Science
Fourth Grade

Content Domain

Physical Science

Cognitive Domain

Knowing

Maximum Points

1

Key

C



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TIMSS2007**Science****Fourth Grade****Content Domain**

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

Grace's teacher places a dish of water on a sunny windowsill. When Grace looks into the dish at the end of the day, the water has disappeared.

Explain why the water has disappeared.

S041211

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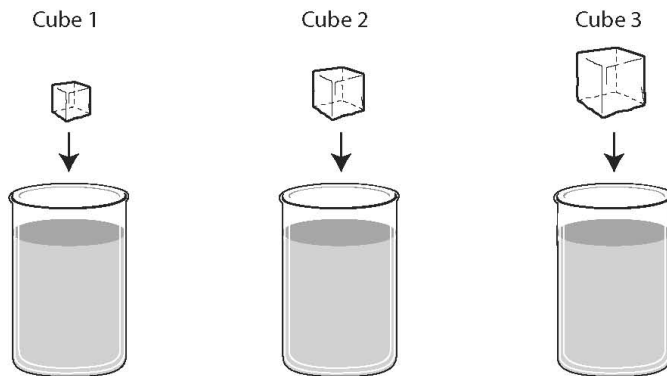
Code	Response	Item: S041211
	Correct Response	
10	<p>Refers specifically to evaporation and/or water vapor forming.</p> <p><i>Examples:</i></p> <p><i>The water evaporates into water vapor.</i></p> <p><i>The sun made the water evaporate.</i></p> <p><i>Because the heat made it evaporate.</i></p> <p><i>The water evaporated.</i></p> <p><i>The water has become water vapor.</i></p> <p><i>The water became a gas.</i></p>	
19	<p>Other correct</p> <p><i>Examples:</i></p> <p><i>The water absorbs into the sky.</i></p>	
	Incorrect Response	
79	<p>Incorrect (including crossed out, erased, stray marks, illegible, or off task)</p> <p><i>Examples:</i></p> <p><i>The water dried up.</i></p> <p><i>The sun heated the water.</i></p> <p><i>The water heated up.</i></p> <p><i>The sun absorbs water.</i></p> <p><i>It has soaked up.</i></p> <p><i>The sun dried it up.</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Susie has three ice cubes of different sizes. She places each ice cube into an identical beaker containing the same volume of water, as shown in the diagram.



What happens to the ice cubes when they are placed in the water?

- (A) Cubes 1, 2, and 3 will sink.
- (B) Cubes 1, 2, and 3 will float.
- (C) Cube 1 will float, and cubes 2 and 3 will sink.
- (D) Cubes 1 and 2 will float, and cube 3 will sink.

Content Domain

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

B

S041051

TIMSS2007**Science****Fourth Grade**

Most of Earth's surface is covered by

- Ⓐ sand
- Ⓑ trees
- Ⓒ water
- Ⓓ mountains

S041089

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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The table below shows the distance from the sun of four planets of the solar system.

	Earth	Mars	Mercury	Saturn
Approximate distance from the sun (millions km)	150	230	58	1,400

A. Which of these planets is closest to the sun?

- Ⓐ Earth
- Ⓑ Mars
- Ⓒ Mercury
- Ⓓ Saturn

B. Which of these four planets is most likely to have the **lowest** average surface temperature?

S041156

TIMSS2007

Science

Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

C

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Science
Fourth Grade

Content Domain
Earth Science

Cognitive Domain
Applying

Maximum Points
1

Key
See scoring guide

S041156

The table below shows the distance from the sun of four planets of the solar system.

	Earth	Mars	Mercury	Saturn
Approximate distance from the sun (millions km)	150	230	58	1,400

A. Which of these planets is closest to the sun?

☐ A Earth
☐ B Mars
☐ C Mercury
☐ D Saturn

B. Which of these four planets is most likely to have the **lowest** average surface temperature?

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Code	Response	Item: S041156B
	Correct Response	
10	Identifies Saturn .	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Fourth Grade

S031229

Which of these groups of animals are ALL mammals?

- (A) duck, eagle, parrot
- (B) mouse, monkey, bat
- (C) butterfly, ant, mosquito
- (D) crocodile, snake, turtle

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007

Science

Fourth Grade



Oak Tree

Sunflower Plant

Can an oak tree and a sunflower plant together produce an oak tree that has sunflowers?

(Check one box.)

☐ Yes

☐ No

Explain your answer.

S031270

Content Domain

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

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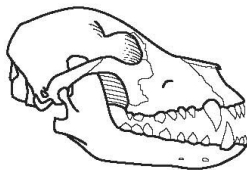
Code	Response	Item: S031270
	Correct Response	
10	<p>NO with a correct explanation based on two different species (types, kinds, etc.) not being able to reproduce (explicitly or implicitly).</p> <p><i>Examples:</i></p> <p><i>The oak tree and sunflower are different so they cannot reproduce together.</i></p> <p><i>They can't reproduce because they aren't the same kind of plant.</i></p> <p><i>Only the same kind of plants can reproduce.</i></p> <p><i>They are not the same type.</i></p> <p><i>Because they are different plants.</i></p> <p><i>The oak tree doesn't have the right kind of pollen.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>NO with no explanation or an incorrect explanation (may include a true statement that does not answer the question).</p> <p><i>Examples:</i></p> <p><i>The tree is too big.</i></p> <p><i>There are no flowers on the tree.</i></p> <p><i>Because it would not be natural.</i></p> <p><i>Because they do not match.</i></p> <p><i>The oak tree has acorns.</i></p> <p><i>Sunflowers do not grow on trees.</i></p> <p><i>The oak tree already has flowers.</i></p> <p><i>You cannot mix them.</i></p>	
71	<p>YES with no explanation or an incorrect explanation.</p> <p><i>Examples:</i></p> <p><i>Because they both have seeds.</i></p> <p><i>Plants can crossbreed.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

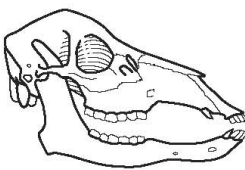
Science

Fourth Grade

Skull 1



Skull 2



The figures above show two animal skulls – Skull 1 and Skull 2.
One of the animals ate only plants, and one of them ate only other animals.

Write down which skull belongs to which type of animal.

The animal that ate plants had Skull _____.

The animal that ate other animals had Skull _____.

Explain your answers based on your knowledge of teeth.

Content Domain

Life Science

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

S031026

Note: For full credit, responses must identify the correct skulls and give an explanation based on a structure of teeth that enables Skull 1 to eat animals or Skull 2 to eat plants. Partial credit is given for responses with a minimal explanation that merely repeats the identification or gives an inadequate description of tooth structure (Code 10). Responses that give a correct identification but with NO explanation are scored as incorrect (Code 70). If one skull number is entered twice, neither is considered correct. For example, a response of 2, 2 should be given a Code 79.

Code	Response	Item: S031026
	Correct Response	
20	<p>Correct skull identification AND correct explanation.</p> <p>Animal that ate plants = SKULL 2</p> <p>Animal that ate other animals = SKULL 1</p> <p>Explanation refers to at least one tooth structure in either Skull 1 or 2 that enables it to eat meat or plants.</p> <p><i>Examples:</i></p> <p><i>Sharp teeth are used for ripping meat and crushing bones.</i></p> <p><i>Flat teeth are needed for chomping on leaves.</i></p> <p><i>Skull 1 has the sharpest teeth for biting through muscles.</i></p> <p><i>The teeth in Skull 2 don't need to be as big or sharp to bite off grass.</i></p> <p><i>The flat teeth in Skull 2 are good for grinding.</i></p> <p><i>Because the teeth on #1 are sharp and the teeth on #2 are dull.</i></p> <p><i>The animal that ate meat has the sharp teeth.</i></p>	
29	Other fully correct	
	Partial Response	
10	<p>Correct skull identification but with an explanation that does not give an adequate description of tooth structure.</p> <p><i>Examples:</i></p> <p><i>Skull 1 ate meat and Skull 2 ate plants.</i></p> <p><i>Skull 1 is a meat eater.</i></p> <p><i>Skull 1 has big teeth.</i></p>	
19	Other partially correct	
	Incorrect Response	
70	Correct skull identification with NO explanation.	
71	<p>Reverses skull identification with or without explanation.</p> <p>Animal that ate plants = SKULL 1</p> <p>Animal that ate other animals = SKULL 2</p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

C

Tommy cut his finger. His body needed energy to help heal the cut. Where did the energy come from to heal the cut?

- (A) from the bandage he put on the cut
- (B) from the antiseptic cream he put on the cut
- (C) from the food he ate
- (D) from the water he drank

S031319

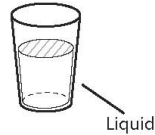
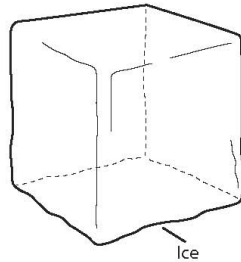
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TIMSS2007

Science Fourth Grade



Ice and liquid are different forms of water. Each form is used in different ways. Write down one way that water is used by humans in each of these forms.

Ice:

Liquid:

S031414

Content Domain
Physical Science

Cognitive Domain
Knowing

Maximum Points
1

Key
See scoring guide

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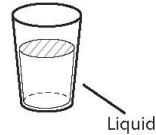
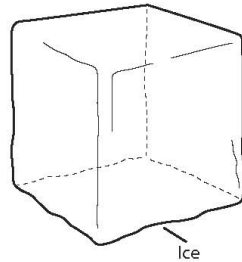


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Code	Response	Item: S031414A
	Correct Response	
10	Names a correct use of ice. <i>Examples:</i> <i>Cooling/freezing, adding to drinks, preserving food, treating injuries/burns, etc.</i>	
19	Other correct	
	Incorrect Response	
70	Refers only to a property of ice with no specific use provided. <i>Examples:</i> <i>Water is ice but a lot colder.</i> <i>You can melt it.</i> <i>Ice is cold, solid, it melts, etc.</i> <i>When you put water into the freezer it becomes ice.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Fourth Grade



Ice and liquid are different forms of water. Each form is used in different ways. Write down one way that water is used by humans in each of these forms.

Ice:

Liquid:

S031414

Content Domain
Physical Science

Cognitive Domain
Knowing

Maximum Points
1

Key
See scoring guide

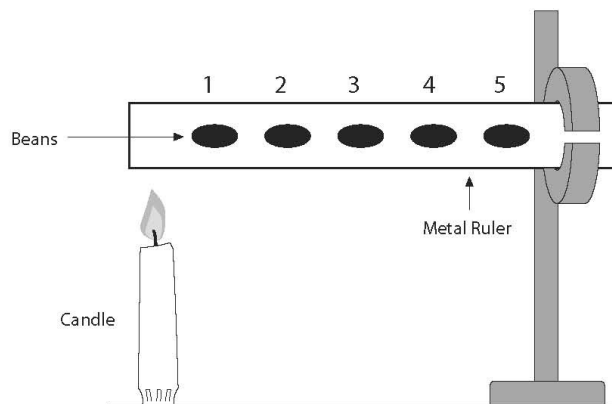
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Code	Response	Item: S031414B
	Correct Response	
10	Names a correct use of liquid water. <i>Examples:</i> <i>Drinking, bathing, swimming, watering plants/crops, cooking, use as a solvent (tea, lemonade, etc.), use in cleaning/washing clothes, putting out fires, etc.</i>	
19	Other correct	
	Incorrect Response	
70	Refers only to a property of water with no specific use provided. <i>Examples:</i> <i>Water is a liquid.</i> <i>When ice melts it forms water.</i> <i>You can pour it.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples:</i> <i>To keep us alive.</i>	
	Nonresponse	
99	Blank	

TIMSS2007

Science
Fourth Grade

Beans are fixed on a metal ruler with butter as shown in the figure above. The ruler is heated at one end. In which order will the beans fall off?

- (A) 1, 2, 3, 4, 5
- (B) 5, 4, 3, 2, 1
- (C) 1, 3, 5, 4, 2
- (D) All at the same time

Content Domain

Physical Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

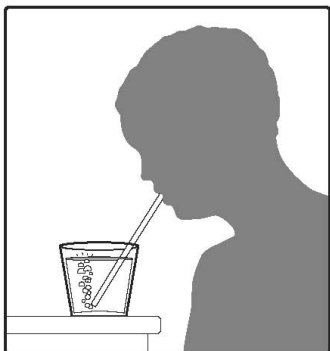
A

S031078

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TIMSS2007**Science****Fourth Grade**

When you blow into water using a straw, bubbles are formed and rise to the top. Why do the bubbles rise in water?

Content Domain

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

S031009

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Note: Priority should be given to Code 10. If responses mention bubbles being “lighter” or “less dense” than water (or similar), then Code 10 should be given even if other correct codes also apply.

Code	Response	Item: S031009
	Correct Response	
10	<p>Refers to bubbles (gas, air, etc.) being “lighter” or less dense than water (or similar).</p> <p><i>Examples:</i></p> <p><i>They are very light .</i></p> <p><i>Bubbles are less dense than the water.</i></p> <p><i>They rise because they are made from air which is lighter than water.</i></p> <p><i>They are not heavy so they go to the top.</i></p> <p><i>Bubbles can float in water.</i></p>	
11	<p>Refers to gas (air, oxygen, carbon dioxide) being inside bubbles. [No explicit reference to bubbles being lighter, less dense, etc.]</p> <p><i>Examples:</i></p> <p><i>He is blowing oxygen.</i></p> <p><i>He blows air and air pushes the bubbles up to the top.</i></p> <p><i>Air bubbles want to get out.</i></p> <p><i>Water pushes the air up.</i></p> <p><i>Because air rises.</i></p> <p><i>Bubbles have air in them.</i></p> <p><i>The gas wants to get free.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>Repeats information given in the stem. [No explicit reference to air (gas) or bubbles being lighter.]</p> <p><i>Examples:</i></p> <p><i>He blows so hard.</i></p> <p><i>Bubbles always go up.</i></p> <p><i>Because you are breathing into the straw.</i></p>	
71	<p>Refers only to pressure (or similar) but with inadequate connection to the problem.</p> <p><i>Examples:</i></p> <p><i>Bubbles rise because of pressure.</i></p> <p><i>Because they cannot get anymore pressure at the bottom.</i></p>	
79	<p>Other incorrect (including crossed out/erased, stray marks, illegible or off task)</p> <p><i>Examples:</i></p> <p><i>There is nothing in the straw.</i></p> <p><i>There isn't anything to weigh them down.</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

B

What is the main reason we can see the Moon?

- Ⓐ The Moon reflects light from the Earth.
- Ⓑ The Moon reflects light from the Sun.
- Ⓒ The Moon produces its own light.
- Ⓓ The Moon is larger than stars.

S031401

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S031384

A. What are the names of two different seasons in the year?

Season 1: _____

Season 2: _____

B. Write down one difference in weather between the seasons you named.

TIMSS2007

Science
Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S031384A
	Correct Response	
10	Identifies two correct seasons. [Adapted for country-specific seasons.] <i>Examples:</i> <i>Summer and winter</i> <i>Spring and autumn</i> <i>Autumn and summer</i>	
19	Other correct	
	Incorrect Response	
70	Identifies only one correct season.	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

S031384

A. What are the names of two different seasons in the year?

Season 1: _____

Season 2: _____

B. Write down one difference in weather between the seasons you named.

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Code	Response	Item: S031384B
	Correct Response	
10	Describes temperature differences. <i>Examples:</i> <i>In winter it is cold, in summer it is warm.</i> <i>Summer is more pleasant because of the heat.</i> <i>It's hot and dry in summer.</i>	
11	Describes precipitation differences. <i>Examples:</i> <i>In the dry season there is very little rain; there is a lot in the rainy season.</i> <i>In winter it snows, in summer it rains.</i> <i>It is humid in the summer.</i>	
19	Other correct <i>Examples:</i> <i>It is more sunny in the summer.</i> <i>There are more storms in winter.</i>	
	Incorrect Response	
70	Difference provided does not explicitly mention a difference in weather condition. <i>Examples:</i> <i>Weather is good in summer and bad in winter.</i> <i>You have to wear more clothes in winter.</i> <i>The leaves fall in autumn, and the flowers blossom in the spring.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

B

Which animal has its skeleton on the outside of its body?

(A)



cat

(B)



ant

(C)



fish

(D)



snake

S041165

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TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

Seeds from a plant can end up a long way away from the plant.

Describe one way that this can happen.

S041023

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Code	Response	Item: S041023
	Correct Response	
10	<p>Refers to wind OR water carrying the seeds away from the plant.</p> <p><i>Examples:</i></p> <p><i>The seeds can be blown away by the wind.</i></p> <p><i>They are dispersed by wind.</i></p> <p><i>The wind.</i></p> <p><i>Seeds can drop into water and be carried to another place.</i></p> <p><i>The seeds can be carried by water.</i></p> <p><i>Water.</i></p>	
11	<p>Refers to organisms such as birds and mammals carrying the seeds away from the plant.</p> <p><i>Examples:</i></p> <p><i>Animals eat the fruit and the seed is dropped far from the plant.</i></p> <p><i>Seeds can be dispersed by animals which catch the seeds in their fur.</i></p> <p><i>Animals such as birds.</i></p> <p><i>Grass seeds attach to humans and are carried away.</i></p>	
19	<p>Other correct</p> <p><i>Examples:</i></p> <p><i>Fruits explode scattering their seeds.</i></p> <p><i>Pods dry out and explode.</i></p> <p><i>The fruit bursts open.</i></p> <p><i>The fruit blows up.</i></p> <p><i>Explosive action.</i></p> <p><i>Explosion.</i></p> <p><i>The seeds pop out.</i></p>	
	Incorrect Response	
79	<p>Incorrect (including crossed out, erased, stray marks, illegible, or off task)</p> <p><i>Examples:</i></p> <p><i>They fall off the plant.</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

A

Which is the best source of vitamins and minerals?

- Ⓐ fruits and vegetables
- Ⓑ bread, rice, and pasta
- Ⓒ milk and milk products
- Ⓓ meat, fish, and poultry

S041047

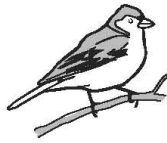
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TIMSS2007

Science Fourth Grade



bird



cloud

A bird is living and a cloud is non-living.

Give two reasons why a bird is classified as living and a cloud is classified as non-living.

1.

2.

S041001

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

2

Key

See scoring guide

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Note: Accepted responses refer to:

Growth/development
 Reproduction
 Respiration
 Intrinsic movement
 Nutrition
 Excretion
 Responding to stimuli

Code	Response	Item: S041001
	Correct Response	
20	<p>Refers to two accepted reasons indicated in the note above.</p> <p><i>Examples:</i></p> <p><i>A bird can lay eggs and breathes.</i></p> <p><i>A bird can move on its own. A bird eats.</i></p> <p><i>A cloud cannot move on its own. Clouds cannot eat.</i></p> <p><i>A bird fluffs up its feathers. A bird gets rid of its waste.</i></p> <p><i>A bird can hatch from an egg and a bird can die.</i></p>	
	Partially Correct Response	
10	<p>Refers to one accepted reason indicated in the note above.</p>	
	Incorrect Response	
79	<p>Incorrect (including crossed out, erased, stray marks, illegible, or off task)</p> <p><i>Examples:</i></p> <p><i>Because a cloud is made of water vapor.</i></p> <p><i>A bird has a brain.</i></p> <p><i>A bird is on the ground, a cloud is in the sky.</i></p> <p><i>Because a cloud is not alive.</i></p> <p><i>A cloud cannot move.</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Carl and Jan each had a sunflower seed taken from the same plant. They took two identical pots and put potting soil in each. They then planted one seed in each pot. Carl looked after one pot in his home, and Jan looked after the other pot in her home.

After some time, they compared the plants and saw that there was a large difference in their growth, as shown in the pictures below.



Carl's plant



Jan's plant

Describe one way in which Carl may have treated his plant differently from the way Jan treated hers.

S041029

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Content Domain

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide



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Code	Response	Item: S041029
	Correct Response	
10	<p>Refers to Carl watering his plant and/or placing his plant in the sun (and/or Jan not doing so).</p> <p><i>Examples:</i></p> <p><i>Carl might have given it more light and water.</i></p> <p><i>Carl made sure the soil did not dry up.</i></p> <p><i>Maybe Carl gave more water to his plant while Jan gave less to her plant.</i></p> <p><i>Carl put his plant on a windowsill in the light.</i></p> <p><i>Jan did not give her plant enough sun or water.</i></p>	
11	<p>Refers to Carl adding fertilizer/nutrients/plant food to his plant (and/or Jan not doing so).</p> <p><i>Examples:</i></p> <p><i>Carl may have used fertilizer.</i></p> <p><i>He added some nutrients to the plant.</i></p> <p><i>He might have given his sunflower plant food.</i></p> <p><i>He might have fed his plant every week and Jan may not have.</i></p> <p><i>Jan did not give her plant as much fertilizer.</i></p>	
19	<p>Other correct</p> <p><i>Examples:</i></p> <p><i>He placed the plant in a warm place.</i></p>	
	Incorrect Response	
79	<p>Incorrect (including crossed out, erased, stray marks, illegible, or off task)</p> <p><i>Examples:</i></p> <p><i>Carl may have used better soil in his pot. (They used the same soil.)</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007

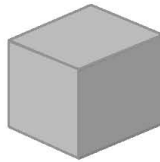
Science

Fourth Grade

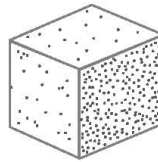
The three objects below are the same shape and size.



wood



iron



styrofoam

Which statement about the weight of the objects is most likely to be correct?

- (A) The wood object is the heaviest.
- (B) The iron object is the heaviest.
- (C) The styrofoam object is the heaviest.
- (D) All three objects weigh the same.

S041054

Content Domain

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

B

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TIMSS2007**Science****Fourth Grade**

S041308

In which example does an object move because of the force of gravity?

- Ⓐ a girl hitting a ball with a bat
- Ⓑ a boy pushing a box across the floor
- Ⓒ a girl hammering a nail into a wall
- Ⓓ a boy falling from a tree onto the ground

Content Domain

Physical Science

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

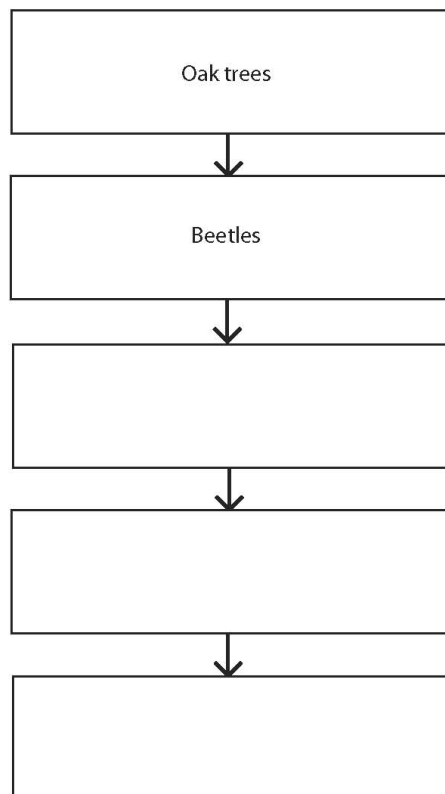
The table below shows where some living things in a community get their energy.

Living Thing	Energy Source
Snakes	Small mammals, birds, and frogs
Beetles	Leaves
Eagles	Small mammals, small reptiles, and fish
Oak trees	The sun
Frogs	Insects

Use the information in the table to complete the food chain shown below.

Write down one living thing in each box.

(The arrows indicate the flow of energy.)



S041179

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Code	Response	Item: S041179
	Correct Response	
10	Correctly fills in the food chain based on information given in the table.	
	<pre>graph TD; A[Oak trees] --> B[Beetles]; B --> C[Frogs]; C --> D[Snakes]; D --> E[Eagles];</pre>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

S041087

Which pie chart shows the proportions of land and water on Earth?

(A)

(B)

(C)

(D)

TIMSS2007

Science Fourth Grade

Content Domain
Earth Science

Cognitive Domain
Applying

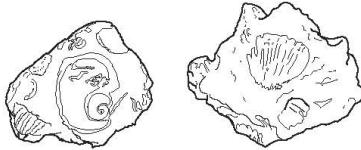
Maximum Points
1

Key
A

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TIMSS2007**Science****Fourth Grade**

The pictures below show some fossils of shellfish that were found in a rock layer on a mountainside.



What is the most likely reason they were found in the rock layer?

- (A) Shellfish lived on dry land long ago.
- (B) Fossils last longer when they form in mountains.
- (C) People left the shells on the mountainside.
- (D) The rock layer was once part of a sea floor.

S041205

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

D

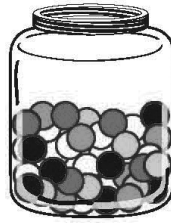
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TIMSS2007**Science****Fourth Grade**

Anna has a mixture of balls in a glass jar, as shown below.



The balls have the same volume but are made of different metals.

Name one property she could use to separate the metal balls into different groups.

S041216

Content Domain

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S041216
	Correct Response	
10	<p>Refers to color and/or magnetism and/or weight/mass.</p> <p><i>Examples:</i></p> <p><i>The balls look different colors.</i></p> <p><i>Color.</i></p> <p><i>She could use a magnet.</i></p> <p><i>Some balls might be magnetic.</i></p> <p><i>The black balls may be attracted to a magnet.</i></p> <p><i>Magnetic/non-magnetic.</i></p> <p><i>Weigh them.</i></p> <p><i>They may have different masses.</i></p> <p><i>By weight.</i></p>	
19	<p>Other correct</p> <p><i>Examples:</i></p> <p><i>Shiny/non-shiny.</i></p> <p><i>Soft/hard.</i></p>	
	Incorrect Response	
70	<p>Refers to volume or shape or size.</p> <p><i>Examples:</i></p> <p><i>Same volume.</i></p> <p><i>She could use their shape.</i></p> <p><i>She could use size.</i></p>	
79	<p>Other incorrect (including crossed out, erased, stray marks, illegible, or off task)</p> <p><i>Examples:</i></p> <p><i>By using a scale.</i></p>	
	Nonresponse	
99	Blank	

S041061

Matter exists in one of three states at room temperature: solid, liquid, or gas.

The table below shows some different types of matter that have been grouped according to their state.

In the third column, write the state of each group.

Group	Matter	State
1	Water and juice	
2	Air and oxygen	
3	Rock and gold	

TIMSS2007

Science Fourth Grade

Content Domain
Physical Science

Cognitive Domain
Applying

Maximum Points
1

Key
See scoring guide

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Code	Response	Item: S041061												
	Correct Response													
10	<p>The table is filled in correctly.</p> <table border="1"> <thead> <tr> <th>Group</th><th>Matter</th><th>State</th></tr> </thead> <tbody> <tr> <td>1</td><td>Water and juice</td><td>Liquid</td></tr> <tr> <td>2</td><td>Air and oxygen</td><td>Gas</td></tr> <tr> <td>3</td><td>Rock and gold</td><td>Solid</td></tr> </tbody> </table>		Group	Matter	State	1	Water and juice	Liquid	2	Air and oxygen	Gas	3	Rock and gold	Solid
Group	Matter	State												
1	Water and juice	Liquid												
2	Air and oxygen	Gas												
3	Rock and gold	Solid												
	Incorrect Response													
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)													
	Nonresponse													
99	Blank													

Note: i) Accepted natural resources and their uses include:

- 1) **Resource:** Air (oxygen, carbon dioxide). **Use:** Breathing.
- 2) **Resource:** Soil, plants, seeds, animals. **Use:** Growing plants, providing food.
- 3) **Resource:** Energy resources (e.g., wood, oil/crude oil, natural gas, solar energy/sun, wind/wind energy, coal). **Use:** Heating, providing electricity, light,
- 4) **Resource:** Manufacturing resources such as wood, rocks, minerals. **Use:** Making/building houses, roads, paper etc.

ii) If responses mention gasoline, petrol, or diesel with a correct use give code 20.

Code	Response	Item: S041202
	Correct Response	
20	Names one of the natural resources indicated in the note above and describes its use. <i>Examples:</i> <i>Air. We breath it in.</i> <i>Plants are used in everyday life to give oxygen.</i> <i>Seeds. If you plant a seed of an orange it will produce a tree and give us oranges.</i> <i>Grass is eaten by cows who produce milk.</i> <i>Animals are used in every day life because we eat them.</i> <i>Wood. It is used for heating and cooking.</i> <i>Wind. It is used for drying clothes.</i> <i>Rocks. They are crushed and used to make roads.</i> <i>Minerals. They are used for making jewelry.</i> <i>Salt. It is used in cooking.</i> <i>Gasoline keeps a car running.</i>	
	Partially Correct Response	
10	Names one of the natural resources indicated in the note above but the description of its use is either nonspecific, incorrect, or absent. <i>Examples:</i> <i>The wind blows in the daytime.</i> <i>The trees are a natural resource because seeds blow off trees and start to grow.</i> <i>Soil is made from decaying matter.</i> <i>Land for walking on.</i> <i>Air. We need it to live.</i>	
	Incorrect Response	
70	Names water with or without a correct use. <i>Examples:</i> <i>A river is used for drinking, bathing, and washing clothes.</i>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task) <i>Examples:</i> <i>Milk for drinking.</i> <i>One other resource that is used in everyday life is electricity.</i>	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Fourth Grade****Content Domain**

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

C

There are different types of desert.

What do they all have in common?

- Ⓐ warm winters
- Ⓑ long summers
- Ⓒ low rainfall
- Ⓓ low day and night temperatures

S041215

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TIMSS2007**Science****Fourth Grade****Content Domain**

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

B

Small grasshoppers shed their outer covering as they grow larger.
Which animal also sheds its outer covering as it grows larger?

- Ⓐ frog
- Ⓑ snake
- Ⓒ fish
- Ⓓ human

S031255

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TIMSS2007

Science Fourth Grade



Look at the picture of the human skeleton shown above.
Write down two reasons why humans need a skeleton.

Reason 1:

Reason 2:

S031240

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide

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Note: Each of the two responses is coded separately. Each correct diagnostic code (10, 11, 12) may be used only once. If the two responses are essentially the same, the second response should be coded as 79. For example, if a response mentions “it protects the brain” and “it protects the heart”, the first response should be given a Code 10, and the second response should be given a Code 79. If only one response is given, the second should be coded as 99.

Code	Response	Item: S031240A,B
	Correct Response	
10	Refers to the skeleton (bones) protecting or enclosing the organs of the body (e.g., heart, lungs, brain, spinal cord). <i>Examples:</i> <i>It protects all your organs.</i> <i>The skull protects the brain.</i> <i>To protect the insides of the body.</i>	
11	Refers to the skeleton (bones) supporting the body (or similar). <i>Examples:</i> <i>It makes it so you can stand up.</i> <i>So we don't fall down.</i>	
12	Refers to the skeleton (bones) enabling movement (or similar). <i>Examples:</i> <i>If you don't have a skeleton you cannot move.</i> <i>To walk.</i> <i>In order to lift things.</i>	
19	Other correct <i>Examples:</i> <i>Bones store calcium.</i> <i>It's where the blood cells are made.</i> <i>Muscles are attached to the bones.</i>	
	Incorrect Response	
70	Mentions only a property or part of the skeleton (bones). [No explicit function is given.] <i>Examples:</i> <i>Bones are hard.</i> <i>The skull.</i> <i>The skeleton is straight.</i>	
71	Gives only a vague response related to shape, appearance or similar. [No explicit function is given.] <i>Examples:</i> <i>So you are not like a rag doll.</i> <i>So they are not all flimsy.</i> <i>We would be mush without it.</i> <i>To give shape to the body.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science
Fourth Grade

Content Domain

Life Science

Cognitive Domain

Knowing

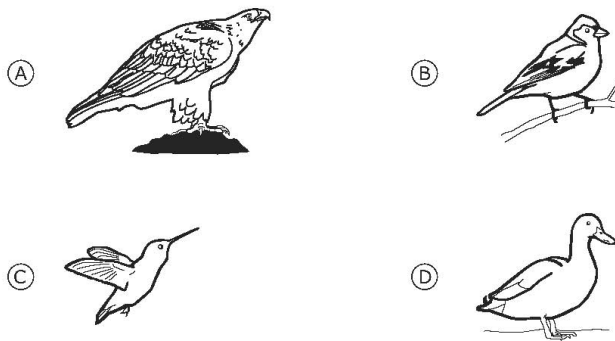
Maximum Points

1

Key

A

Which bird is most likely to eat small mammals?



S031239

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TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

A new animal is discovered living in the sea. It is thought to be either a fish or a mammal.

Name one feature that fish have and one feature that mammals have that would help you find out which type of animal it is.

A. Feature of Fish:

B. Feature of Mammals:

S031235

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Note: If a response includes both correct and incorrect features, it should be scored as correct. Since only one feature is asked for, the incorrect portion is not considered unless it negates the correct portion.

Code	Response	Item: S031235A
	Correct Response	
10	Names a physical feature or behavior of fish that could be used to differentiate fish from marine (water) mammals. <i>Examples:</i> <i>Gills ('breathes' in oxygen from water)</i> <i>Scales</i> <i>Lays eggs</i> <i>Two-chambered heart</i> <i>Swim (gas) bladder</i>	
11	Refers to "cold-blooded" nature of fish.	
19	Other correct	
	Incorrect Response	
70	Names a physical feature or behavior of fish that CANNOT be used to differentiate fish from mammals. <i>Examples:</i> <i>Fins</i> <i>They can swim.</i> <i>Tail</i>	
71	Names an example of a "fish" rather than a characteristic. [May include some organisms that are not truly fish, such as jellyfish.] <i>Examples:</i> <i>Catfish</i> <i>Shark</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Life Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

A new animal is discovered living in the sea. It is thought to be either a fish or a mammal.

Name one feature that fish have and one feature that mammals have that would help you find out which type of animal it is.

A. Feature of Fish:

B. Feature of Mammals:

S031235

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

Code	Response	Item: S031235B
	Correct Response	
10	Names a physical feature or behavior of mammals that could be used to differentiate marine (water) mammals from fish. <i>Examples:</i> <i>Lungs (come to the surface to breathe air)</i> <i>“Blowhole”</i> <i>Hair or fur</i> <i>Milk glands (produces milk for their young)</i> <i>Flippers (adapted front limbs)</i> <i>Gives live birth</i>	
11	Refers to “warm-blooded” nature of mammals.	
19	Other correct	
	Incorrect Response	
70	Names a feature/behavior of mammals that CANNOT be used to differentiate mammals from fish. <i>Examples:</i> <i>Teeth, ribs, nostrils</i>	
71	Names an example of a marine (water) mammal rather than a characteristic. <i>Examples:</i> <i>Whale, dolphin, seal</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Fourth Grade****Content Domain**

Physical Science

Cognitive Domain

Knowing

Maximum Points

1

Key

C

Sue measured how much sugar would dissolve in a cup of cold water, a cup of warm water, and a cup of hot water. What did she most likely observe?

- Ⓐ The cold water dissolved the most sugar.
- Ⓑ The warm water dissolved the most sugar.
- Ⓒ The hot water dissolved the most sugar.
- Ⓓ The cold water, warm water and hot water all dissolved the same amount of sugar.

S031205

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Note: Credit may be given for responses that refer to solid, liquid, and gas as ‘ice’, ‘water’ and ‘water vapor’.

Code	Response	Item: S031399A
	Correct Response	
10	Refers explicitly to boiling or evaporation .	
11	Refers to adding heat (energy) or raising the temperature (explicitly or implicitly). <i>Examples:</i> <i>Put it in a pot and turn on the stove.</i> <i>Heat it.</i> <i>Put it out in the sun.</i> <i>Make it hot.</i>	
19	Other correct	
	Incorrect Response	
70	Refers to the process of freezing (explicitly or implicitly).	
71	Refers to the process of melting (explicitly or implicitly).	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

S031399

A liquid can turn into a gas or turn into a solid.

A. How can you turn a liquid into a gas?

B. How can you turn a liquid into a solid?

TIMSS2007

Science Fourth Grade

Content Domain

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S031399B
	Correct Response	
10	Refers explicitly to freezing .	
11	Refers to cooling, removing heat (energy) or decreasing the temperature (explicitly or implicitly). <i>Examples:</i> <i>Put it in the freezer.</i> <i>Cool it down.</i> <i>Make it cold.</i>	
19	Other correct	
	Incorrect Response	
70	Refers to the process of boiling (explicitly or implicitly).	
71	Refers to the process of melting (explicitly or implicitly).	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

S031393

People should not drink water directly from oceans and seas.
Explain why.

TIMSS2007

Science Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S031393
	Correct Response	
10	Refers only to the ocean water being salty. <i>Examples:</i> <i>Ocean water contains a lot of salt.</i> <i>Salt water makes you sick.</i> <i>There is salt and sand.</i> <i>There is too much salt in it.</i>	
11	Refers only to oceans being polluted, dirty, containing germs, etc. <i>Examples:</i> <i>Ocean water has a lot of bacteria in it.</i> <i>It might have germs in it that make you sick.</i> <i>It needs to be purified first.</i> <i>Ocean water could be polluted.</i> <i>They could get poisoned.</i>	
12	Response includes a combination of both codes 10 and 11. <i>Examples:</i> <i>It is salty and smelly and has dirt in it.</i> <i>It might be dirty, polluted and salty.</i>	
19	Other correct	
	Incorrect Response	
70	Mentions only that ocean water makes you sick (or similar). [No reference to salt, pollution, etc.] <i>Examples:</i> <i>It makes you sick.</i> <i>It's not healthy to drink ocean water.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples:</i> <i>It smells.</i>	
	Nonresponse	
99	Blank	

S031278

Write down one way that the Sun and the Moon are different from each other.

TIMSS2007

Science

Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Note: If more than one response is given, the code corresponding to the first correct response should be assigned. Since only one response is asked for, the incorrect portion of the response should not be considered unless it negates the correct portion of the response.

Code	Response	Item: S031278
	Correct Response	
10	<p>Refers to the Sun giving off light or heat and/or the moon not.</p> <p><i>Examples:</i></p> <p><i>The Sun brings light and the Moon does not.</i></p> <p><i>Sun is hot, moon is not.</i></p> <p><i>The Sun is a big fire ball.</i></p> <p><i>The sun shines light. The moon glows.</i></p> <p><i>The moon is cold. The sun is not.</i></p> <p><i>The Sun makes its own light but the moon reflects it.</i></p>	
11	<p>Refers to differences in visibility (or appearance).</p> <p><i>Examples:</i></p> <p><i>Sun is bright, so it's easier to see during the day.</i></p> <p><i>Sun is yellow, not blue like moon.</i></p> <p><i>Sun is always the same shape but moon is not.</i></p> <p><i>The Sun comes up every morning, but the moon does not.</i></p> <p><i>They are different colors.</i></p> <p><i>The Sun doesn't come out at night.</i></p> <p><i>The moon can block the sun, but the sun cannot block the moon.</i></p>	
12	<p>Refers to differences in size, composition or physical/structural features.</p> <p><i>Examples:</i></p> <p><i>Sun is a star.</i></p> <p><i>Moon has craters.</i></p> <p><i>Sun has lots of gases and moon is just rock.</i></p> <p><i>The Sun is bigger.</i></p>	
19	<p>Other correct</p> <p><i>Examples:</i></p> <p><i>The moon is closer than the Sun.</i></p>	
	Incorrect Response	
70	<p>Refers to the moon only being visible at night.</p> <p><i>Examples:</i></p> <p><i>The moon only comes out at night.</i></p> <p><i>You see the Sun in the day and the moon at night.</i></p> <p><i>One comes out in the day and one comes out at night.</i></p>	
79	<p>Other incorrect (including crossed out/erased, stray marks, illegible or off task)</p> <p><i>Examples:</i></p> <p><i>There is no gravity on the moon.</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Fourth Grade**

S031317

Which living organism makes its own food using sunlight?

- Ⓐ lizard
- Ⓑ tree
- Ⓒ deer
- Ⓓ hawk

Content Domain

Life Science

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007**Science****Fourth Grade****Content Domain**

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

There is a giant turtle that lives on an island. He is the only turtle left of a special type of giant turtle.

Can he reproduce so that this type of turtle does not die out?

(Check one box.)

☐ Yes

☐ No

Give a reason for your answer.

S031190

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Note: To receive credit, responses must give a reason based on the need for a mate (Code 10) or to the role of males versus females (Code 11). Responses that refer ONLY to the turtle being male should be scored as incorrect (Code 70). Priority should be given to Code 10.

Code	Response	Item: S031190
	Correct Response	
10	NO with a reason based on the need for a mate (female) in order to reproduce (explicitly or implicitly). Examples: It is a male turtle so he needs a female. Turtles cannot reproduce all by themselves. The turtle needs a mate. Because he is the last of his species.	
11	NO with a reason based on the different roles of females versus males in reproduction (ability to lay eggs). [No explicit statement about the need for a mate is given.] Examples: There are no females on the island. Because it is a male turtle and only females can have babies. Females are the ones that lay eggs.	
19	Other correct	
	Incorrect Response	
70	NO with a reason based only on the turtle being male. [No explicit statement about the need for a mate or the role of females versus males.] Examples: Male turtles cannot reproduce. Because the turtle is a male.	
71	NO with no reason or another incorrect reason. [May include a true statement but is not a correct answer to the question.] Examples: He might be too old.	
72	YES with no reason or an incorrect reason. [May include a true statement but is not a correct answer the question.] Examples: He could leave the island and mate with another type of turtle. He has lots of room on the island.	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

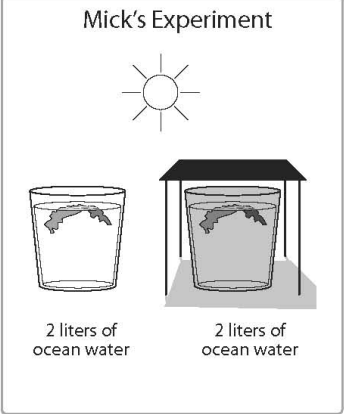
Fourth Grade

Seaweed that grows in the ocean is not often found growing in rock pools – holes in the rocks that fill with ocean water at high tide.

Four students want to know if seaweed does not grow in rock pools because the water is too salty. They each set up an experiment to test this idea. The pictures below show their experimental set-ups.

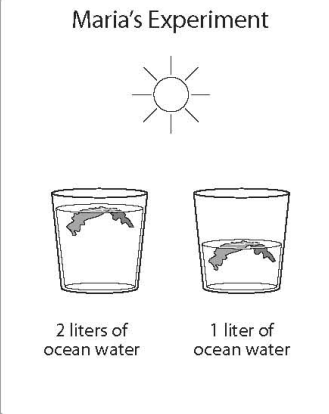
Which set-up is best for testing the idea that seaweed cannot grow in very salty ocean water?

(A) Mick's Experiment



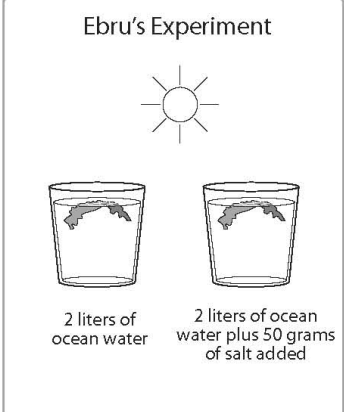
2 liters of ocean water 2 liters of ocean water

(B) Maria's Experiment



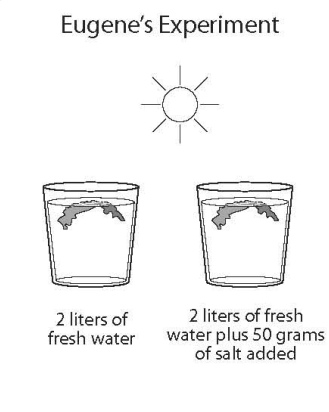
2 liters of ocean water 1 liter of ocean water

(C) Ebru's Experiment



2 liters of ocean water 2 liters of ocean water plus 50 grams of salt added

(D) Eugene's Experiment



2 liters of fresh water 2 liters of fresh water plus 50 grams of salt added

Content Domain

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

C

S031431

Content Domain
Life Science


Cognitive Domain
Knowing

Maximum Points
1

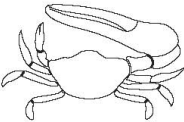
Key
C

S031283

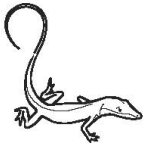
Which of these animals is most likely to live in the desert?




(A) bear



(B) crab



(C) lizard



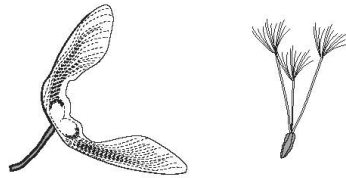
(D) tiger

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Science

Fourth Grade



The picture above shows two types of seeds. How are these seeds scattered?

- (A) by bursting
- (B) by sticking to animals
- (C) by being eaten by animals
- (D) by wind

S031426

Content Domain

Life Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

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TIMSS2007**Science****Fourth Grade**

Which of these objects will rust?

- Ⓐ wood chips
- Ⓑ plastic straws
- Ⓒ iron nails
- Ⓓ glass beads

S031422

Content Domain

Physical Science

Cognitive Domain

Knowing

Maximum Points

1

Key

C

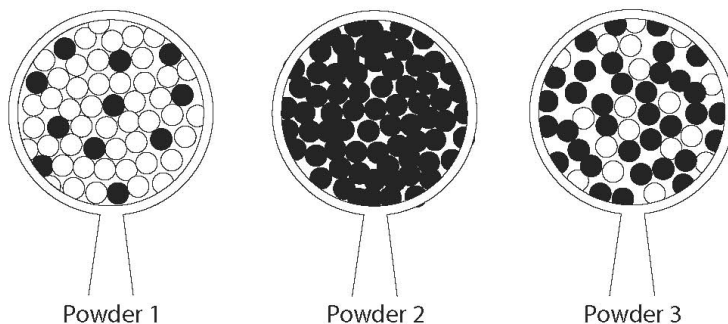
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Science Fourth Grade



The pictures above show three different powders seen through a magnifying lens. Which of these are most likely mixtures?

- (A) Powders 1 and 2 only
- (B) Powders 1 and 3 only
- (C) Powders 2 and 3 only
- (D) Powders 1, 2 and 3

Content Domain
Physical Science

Cognitive Domain
Applying

Maximum Points
1

Key
B

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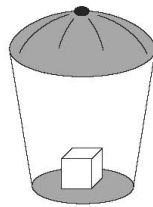
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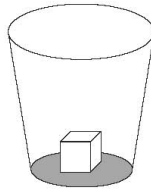
Science

Fourth Grade

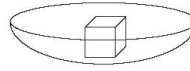
Which ice cube will take the longest time to melt?



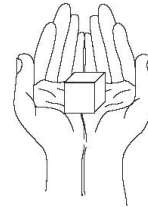
(A)



(B)



(C)



(D)

S031075

Content Domain

Physical Science

Cognitive Domain

Applying

Maximum Points

1

Key

A

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Science
Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

S031047

Some cars are parked outside overnight. In the morning they are wet even though it did not rain.

Where did the water come from?

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Note: Priority should be given to Code 10. If a response mentions condensation, then Code 10 should be given even if other correct codes apply.

Code	Response	Item: S031047
	Correct Response	
10	<p>Refers explicitly to condensation (or equivalent).</p> <p><i>Examples:</i></p> <p><i>It might have condensed into water on the cars.</i></p> <p><i>It comes from cold weather on the car that condenses.</i></p> <p><i>It came from condensation.</i></p> <p><i>The car was wet because if it was humid it condenses on the car and becomes wet.</i></p> <p><i>From water vapor that condenses and drops onto the car.</i></p>	
11	<p>Refers to water in the air or gives a specific form of water in the air (e.g., fog, clouds, water vapor, dew, frost, etc.). [No explicit mention of condensation.]</p> <p><i>Examples:</i></p> <p><i>Because it is cold there is lots of water vapor that cooled down and changed into liquid.</i></p> <p><i>The water came from all the dampness in the air.</i></p> <p><i>The car is wet because the wet air makes dew.</i></p> <p><i>It came from the frost in the morning.</i></p> <p><i>It came from the sky and clouds.</i></p> <p><i>It came from the surrounding air.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>States that water came from rain, snow or other form of precipitation.</p> <p><i>Examples:</i></p> <p><i>It could have snowed and the snow melted.</i></p> <p><i>The car was parked under a tree that had recently been rained on.</i></p> <p><i>The moisture in the sky makes it rain on the car.</i></p>	
71	<p>States that someone washed, sprayed or splashed the car (or similar).</p> <p><i>Examples:</i></p> <p><i>Somebody could have soaked it with a bucket or a rag.</i></p> <p><i>The water came from a hose.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

C

Scientists believe that oceans once covered much of what is now land. Which of these things found on land led scientists to believe this?

- Ⓐ underground water
- Ⓑ sandy soil
- Ⓒ fossils of fish
- Ⓓ salty lakes

S031387



S031396

Wood is a resource that is used by humans. Name two different things that wood is used for.

- 1.
- 2.

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Science Fourth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide



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Note: Each of the two responses is coded separately. The same code may be used twice if they are based on general categories. However, if the two responses are essentially the same, the second response should be coded as 79. For example, if a response mentions “burn it for heat” and “burn it to cook”, then the first response should be given a Code 13, and the second response should be given a Code 79. If a response mentions “pencils” and “furniture”, both responses should receive Code 12. If only one response is given, the second should be coded as 99.

Code	Response	Item: S031396A,B
	Correct Response	
10	States that wood is used to make paper.	
11	States that wood is used for lumber to build houses or other buildings.	
12	States that wood is used to make objects for various uses. <i>Examples:</i> <i>furniture, pencils, boats, carts, fences, toys, crates, barrels, etc.</i>	
13	States that wood can be burned (for heating, cooking, etc.). <i>Examples:</i> <i>We burn it to heat our homes.</i> <i>For heat.</i> <i>To keep the stove going.</i> <i>You can burn it.</i> <i>To build fires.</i> <i>It's used in fireplaces.</i>	
19	Other correct	
	Incorrect Response	
79	Incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	



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