

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS



TIMSS 2007 User Guide for the International Database

Released Items

Science – Eighth 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
S032115	S	8	S01	01	Earth Science	Knowing	1	D
S032565	S	8	S01	02	Chemistry	Reasoning	1	See scoring guide
S032403	S	8	S01	03	Physics	Knowing	1	C
S032273	S	8	S01	04	Physics	Knowing	1	C
S032019A	S	8	S01	05	Earth Science	Applying	1	See scoring guide
S032019B	S	8	S01	05	Earth Science	Applying	1	See scoring guide
S032516	S	8	S01	06	Earth Science	Applying	1	See scoring guide
S032620	S	8	S01	07	Biology	Reasoning	1	A
SP32693	S	8	S01	08				
S032693A	S	8	S01	08	Biology	Reasoning	1	See scoring guide
S032693B	S	8	S01	08	Biology	Reasoning	1	See scoring guide
SP32695	S	8	S01	09				
S032695	S	8	S01	09	Biology	Reasoning	2	See scoring guide
S032697	S	8	S01	10	Biology	Applying	2	See scoring guide
S042009	S	8	S02	01	Biology	Knowing	1	C
S042313	S	8	S02	02	Biology	Applying	1	See scoring guide
S042059	S	8	S02	03	Biology	Knowing	1	D
S042011	S	8	S02	04	Biology	Applying	1	See scoring guide
S042028	S	8	S02	05	Biology	Knowing	1	C
S042001	S	8	S02	06	Biology	Knowing	1	B
S042276	S	8	S02	07	Physics	Applying	1	C
S042279	S	8	S02	08	Physics	Knowing	1	B
S042083	S	8	S02	09	Chemistry	Reasoning	2	See scoring guide
S042106	S	8	S02	10	Chemistry	Applying	1	See scoring guide
S042071	S	8	S02	11	Chemistry	Knowing	1	C
S042101	S	8	S02	12	Chemistry	Applying	1	See scoring guide
S042307	S	8	S02	13	Earth Science	Knowing	1	See scoring guide
S042405	S	8	S02	14	Earth Science	Applying	1	C
S042244A	S	8	S02	15	Physics	Applying	1	See scoring guide
S042244B	S	8	S02	15	Physics	Applying	1	See scoring guide
S042153	S	8	S02	16	Earth Science	Knowing	1	See scoring guide
S022183	S	8	S03	01	Chemistry	Knowing	1	B
S022276	S	8	S03	02	Chemistry	Knowing	1	A
S022115	S	8	S03	03	Biology	Reasoning	1	D
S022022	S	8	S03	04	Physics	Reasoning	1	See scoring guide
S022019	S	8	S03	05	Physics	Applying	1	C
S022002	S	8	S03	06	Physics	Applying	1	C
S022294	S	8	S03	07	Earth Science	Knowing	1	B
S022106	S	8	S03	08	Biology	Knowing	1	C
S022244	S	8	S03	09	Earth Science	Reasoning	1	See scoring guide
S022150	S	8	S03	10	Biology	Applying	1	A
S022042	S	8	S03	11	Physics	Reasoning	1	B
S022289	S	8	S03	12	Biology	Reasoning	2	See scoring guide
S022069	S	8	S03	13	Physics	Applying	1	See scoring guide
S022268	S	8	S03	14	Physics	Reasoning	1	See scoring guide

Item ID	Subject	Grade	Block	Block Seq	Content Domain	Cognitive Domain	Maximum Points	Key
S042013	S	8	S04	01	Biology	Knowing	1	B
S042006	S	8	S04	02	Biology	Knowing	1	C
S042310	S	8	S04	03	Biology	Reasoning	2	See scoring guide
S042052	S	8	S04	04	Biology	Applying	2	See scoring guide
S042054	S	8	S04	05	Biology	Knowing	1	D
S042043	S	8	S04	06	Biology	Applying	1	See scoring guide
S042196	S	8	S04	07	Physics	Applying	1	See scoring guide
S042061	S	8	S04	08	Physics	Applying	1	D
S042292	S	8	S04	09	Physics	Applying	2	See scoring guide
S042109	S	8	S04	10	Chemistry	Knowing	1	B
S042232A	S	8	S04	11	Chemistry	Reasoning	1	See scoring guide
S042232B	S	8	S04	11	Chemistry	Reasoning	1	See scoring guide
S042232C	S	8	S04	11	Chemistry	Reasoning	1	C
S042294	S	8	S04	12	Physics	Reasoning	1	C
S042149	S	8	S04	13	Earth Science	Knowing	1	See scoring guide
S042155	S	8	S04	14	Earth Science	Applying	1	See scoring guide
S042150	S	8	S04	15	Earth Science	Knowing	1	A
S022290	S	8	S05	01	Earth Science	Knowing	1	D
S022292	S	8	S05	02	Physics	Reasoning	1	See scoring guide
S022054	S	8	S05	03	Physics	Applying	1	D
S022181	S	8	S05	04	Chemistry	Knowing	1	B
S022208	S	8	S05	05	Chemistry	Knowing	1	A
S022078	S	8	S05	06	Earth Science	Applying	1	See scoring guide
S022126	S	8	S05	07	Biology	Knowing	1	A
S022281	S	8	S05	08	Physics	Applying	1	See scoring guide
S032385	S	8	S05	09	Biology	Knowing	1	B
S032035	S	8	S05	10	Biology	Knowing	1	C
S032519	S	8	S05	11	Earth Science	Knowing	1	See scoring guide
S032683	S	8	S05	12	Chemistry	Applying	1	D
S032258	S	8	S05	13	Biology	Knowing	1	C
S032120A	S	8	S05	14	Earth Science	Applying	1	See scoring guide
S032120B	S	8	S05	14	Earth Science	Applying	1	See scoring guide
S032606	S	8	S07	01	Biology	Knowing	1	D
S032015	S	8	S07	02	Biology	Knowing	1	See scoring guide
S032310	S	8	S07	03	Biology	Knowing	2	See scoring guide
S032680	S	8	S07	04	Chemistry	Reasoning	2	See scoring guide
S032672	S	8	S07	05	Chemistry	Knowing	1	B
S032392	S	8	S07	06	Physics	Applying	1	C
S032425	S	8	S07	07	Physics	Knowing	1	A
S032257	S	8	S07	08	Physics	Knowing	1	B
S032663	S	8	S07	09	Earth Science	Applying	1	A
S032660	S	8	S07	10	Earth Science	Knowing	1	D
S032555	S	8	S07	11	Earth Science	Reasoning	1	See scoring guide
S032122	S	8	S07	12	Biology	Knowing	1	See scoring guide

TIMSS2007**Science****Eighth Grade**

Which of the following is closest to the percentage of the total water on earth that is fresh water?

- Ⓐ 100%
- Ⓑ 90%
- Ⓒ 70%
- Ⓓ 3%

S032115

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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TIMSS2007

Science

Eighth Grade

	Temperature	Dissolved Salt	Volume of Water	Density
Pure Water	25°C	0 g	100 ml	1.0 g/ml
Salt Solution	25°C	10 g	100 ml	?

The incomplete table above compares some data for pure water and for a salt solution.

What is the density of the salt solution?

(Check one box.)

- ☐ 1.0 g/ml
- ☐ Less than 1.0 g/ml
- ☐ Greater than 1.0 g/ml

Explain your answer.

Content Domain

Chemistry

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

S032565



Note: To receive credit, responses must check >1g/ml AND give an explanation. Credit will be given both for higher-level explanations based on the added mass from dissolved salt (Code 10) as well as responses with minimal explanations indicating factual knowledge that the density of salt water is greater (Code 11).

Code	Response	Item: S032565
	Correct Response	
10	<p>>1g/ml with an explanation based on the added mass from dissolved salt (and the volume staying essentially the same).</p> <p><i>Examples:</i></p> <p><i>When the salt is added to the water, it dissolves and gives into the water another g/ml.</i></p> <p><i>Pure water has 0 g of salt and 100 ml water. If salt solution has 10 g more salt than pure water, the density should be greater than 1g/ml.</i></p> <p><i>As the dissolved salt increases, the density will increase because of the increase in mass which makes the particle per unit more.</i></p> <p><i>The density is 1.1 g/ml [(100g of water + 10g of salt)/100 ml]</i></p>	
11	<p>>1g/ml with minimal explanation.</p> <p><i>Examples:</i></p> <p><i>The density always goes up when you add salt.</i></p> <p><i>Salt will make the water heavier.</i></p> <p><i>There is more salt which has dissolved.</i></p> <p><i>Impure solutions have greater densities.</i></p> <p><i>Because it's salt water. Pure water doesn't have any salt in it.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>>1g/ml with no explanation or an incorrect explanation.</p> <p><i>Examples:</i></p> <p><i>25 X 100/10 = 20.5 g/ml</i></p> <p><i>You will need more hot water to dissolve the salt.</i></p>	
71	<p>1g/ml with or without explanation.</p> <p><i>Examples:</i></p> <p><i>The salt just dissolves and nothing happens.</i></p> <p><i>Salt solution equals pure water.</i></p>	
72	<p><1g/ml with or without explanation.</p> <p><i>Examples:</i></p> <p><i>Salt disappears when it dissolves.</i></p> <p><i>The more you heat the salt, the quicker it will dissolve. So, in the end nothing will be left.</i></p> <p><i>Density is 0.1 g/ml (10g salt /100 ml).</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

S032403

Which statement is true about the particles of a liquid compared to the particles of a gas?

- Ⓐ Particles of a liquid are slower and farther apart.
- Ⓑ Particles of a liquid are faster and farther apart.
- Ⓒ Particles of a liquid are slower and closer together.
- Ⓓ Particles of a liquid are faster and closer together.

Content Domain

Physics

Cognitive Domain

Knowing

Maximum Points

1

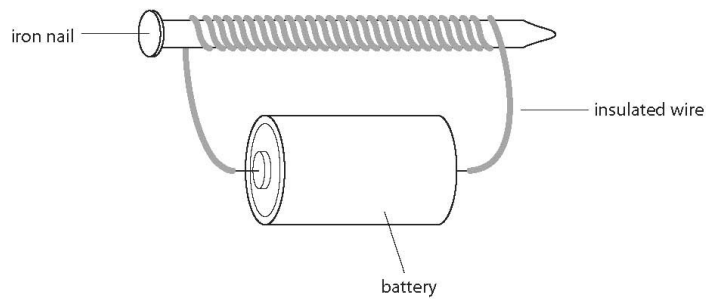
Key

C

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TIMSS2007**Science**
Eighth Grade

The figure shows an iron nail with an insulated wire coiled around it. The wire is connected to a battery.

What will happen to the nail when current flows through the wire?

- Ⓐ The nail will melt.
- Ⓑ Electric current will flow through the nail.
- Ⓒ The nail will become a magnet.
- Ⓓ Nothing will happen to the nail.

S032273

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Content Domain

Physics

Cognitive Domain

Knowing

Maximum Points

1

Key

C



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TIMSS2007**Science****Eighth Grade****Content Domain**

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

The weathering (gradual breaking down) of rocks can be caused by both physical and chemical processes. Write down one physical process and one chemical process. Explain how each can cause the weathering of rocks.

Physical Process:

Chemical Process:

S032019

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Note: To receive credit, a response must include an explanation. Responses that only give the name of a process/agent without further explanation are scored as incorrect (Code 70). Destructive forces due to sudden action are scored as incorrect (Code 71), as they are not the result of a gradual weathering process.

Code	Response	Item: S032019A
	Correct Response	
10	Identifies a physical process or agent and explains how it can cause weathering. <i>Examples:</i> <i>Rocks expand and contract due to changes in temperature.</i> <i>Water collects in cracks and freezes and causes the rocks to break apart.</i> <i>Water pours down a rock face, causing it to weather.</i> <i>Wind blowing across rocks causes pieces to break off.</i> <i>Rain slowly makes rocks break down.</i> <i>Glaciers or water can cause rocks to break away.</i> <i>When water runs down a stream it carries away tiny pieces of rock downstream.</i> <i>Plants grow into the cracks of rocks.</i>	
19	Other correct	
	Incorrect Response	
70	Names a physical process or agent without further explanation. <i>Examples:</i> <i>Erosion, wind, rain, weather, exfoliation.</i>	
71	Refers to a destructive force caused by sudden action (not the result of a gradual weathering process). <i>Examples:</i> <i>Rocks can be broken down using the force of a hammer.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

The weathering (gradual breaking down) of rocks can be caused by both physical and chemical processes. Write down one physical process and one chemical process. Explain how each can cause the weathering of rocks.

Physical Process:

Chemical Process:

S032019

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Note: To receive credit, a response must include an explanation. Responses that only give the name of a process/agent without further explanation are scored as incorrect (Code 70).

Code	Response	Item: S032019B
	Correct Response	
10	Identifies a chemical process or agent and explains how it can cause weathering. <i>Examples:</i> <i>Oxygen combines with metals in rocks to break them down.</i> <i>Carbon dioxide dissolved in water dissolves limestone.</i> <i>Acid rain can affect rocks by disintegrating them slowly.</i> <i>When we don't dispose of our waste properly it may contain some substance that can break down the rocks when it seeps into the soil.</i> <i>Chemicals secreted by living organisms such as lichen and mosses dissolve rock.</i> <i>Some chemicals (maybe acid) that is put onto rocks will react with the elements and cause it to erode.</i>	
19	Other correct	
	Incorrect Response	
70	Names a chemical process or agent without further explanation of how it causes weathering. <i>Examples:</i> <i>Acid rain.</i> <i>Acid.</i> <i>Lava and fire.</i> <i>It is a chemical process when two or more substances are joined.</i> <i>Rocks are broken down by mixing up chemicals.</i> <i>A chemical seeps into the rocks.</i>	
71	Identifies a physical process. <i>Examples:</i> <i>Erosion and wind.</i> <i>Melting.</i> <i>Water gets in and creates cracks and it collapses.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

In a rural area, there are many trees. The people living in the area decide to cut down the trees for wood.

Give one possible long-term effect of their decision on the environment.

S032516

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Note: Credit is given both for responses that give a negative (Code 10) or a neutral/positive (Code 11) long-term effect on the environment (plants/animals, land, water, atmosphere, etc.). Responses that refer only to the loss of trees or an effect on humans are scored as incorrect. If more than one effect is included, the code corresponding to the first correct effect should be given even if other incorrect effects are included. Since only one effect is asked for, the incorrect portion is not considered unless it negates the correct portion of the response.

Code	Response	Item: S032516
	Correct Response	
10	<p>States a negative effect on the environment (e.g., loss of habitat for plants/animals, soil erosion, atmospheric changes, desertification, changes in rainfall, etc.).</p> <p><i>Examples:</i></p> <p><i>Some animals will lose their homes and die.</i></p> <p><i>It can affect the animals because some of them need to eat off the trees.</i></p> <p><i>Animals will die or move to another location.</i></p> <p><i>No trees to absorb water, therefore rain and wind will erode the soil.</i></p> <p><i>There will be floods a lot more often.</i></p> <p><i>It will lead to global warming because the trees won't use up carbon dioxide anymore.</i></p> <p><i>There will be no more trees to give off oxygen.</i></p> <p><i>When all the trees are cut down there will be less rain in the area.</i></p> <p><i>The area can become like a desert without any trees.</i></p>	
11	<p>States a neutral or positive effect on the environment (e.g., a change in the balance of plant life, increased habitat for some types of animals/plants, etc.).</p> <p><i>Examples:</i></p> <p><i>When all the trees are cut down there will be more room for some types of animals and plants.</i></p> <p><i>Different types of plants could now grow there.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>Mentions only the loss of trees.</p> <p><i>Examples:</i></p> <p><i>All the trees might eventually be gone.</i></p> <p><i>The trees will take a long time to grow back.</i></p>	
71	<p>Mentions only an effect related to human use of wood or cleared land. [Long-term effect on the environment not clear.]</p> <p><i>Examples:</i></p> <p><i>They would have more firewood.</i></p> <p><i>More free space for houses, malls and businesses.</i></p> <p><i>Won't have enough trees in the future for stuff like houses and paper.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Reasoning

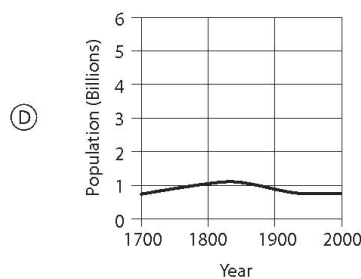
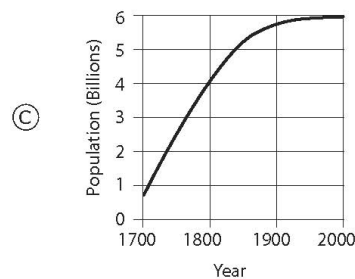
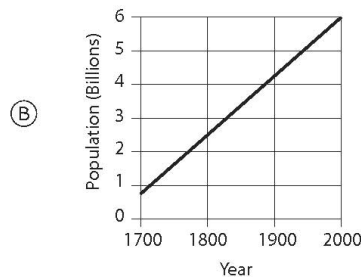
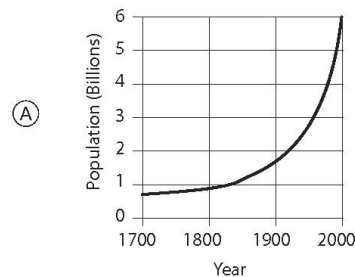
Maximum Points

1

Key

A

Which of the following graphs best shows how the human population of the world has changed over the last 300 years?



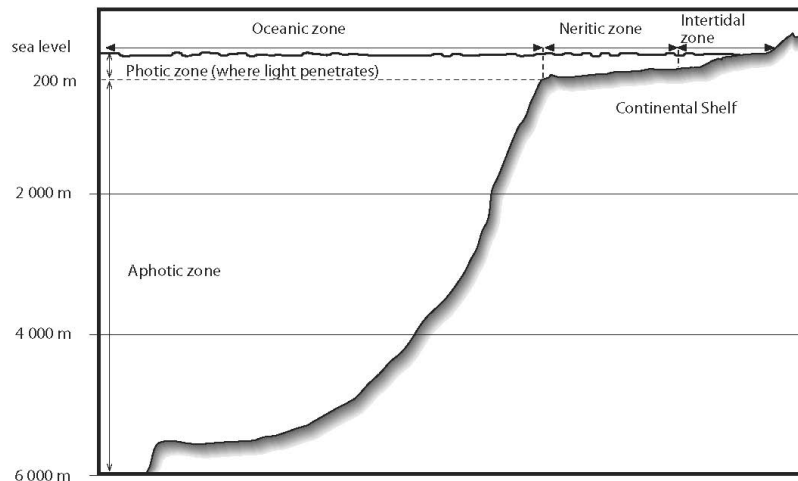
S032620

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The following diagram shows a cross-section through an ocean. A number of organisms (plants and animals) live in the different regions of the ocean and depend on one another and on the Sun for survival.



Questions for Life in the Oceans begin on the next page. ➡

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TIMSS2007

Science
Eighth Grade

Content Domain

Cognitive Domain

Maximum Points

Key

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Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Reasoning

Maximum Points

1

Key

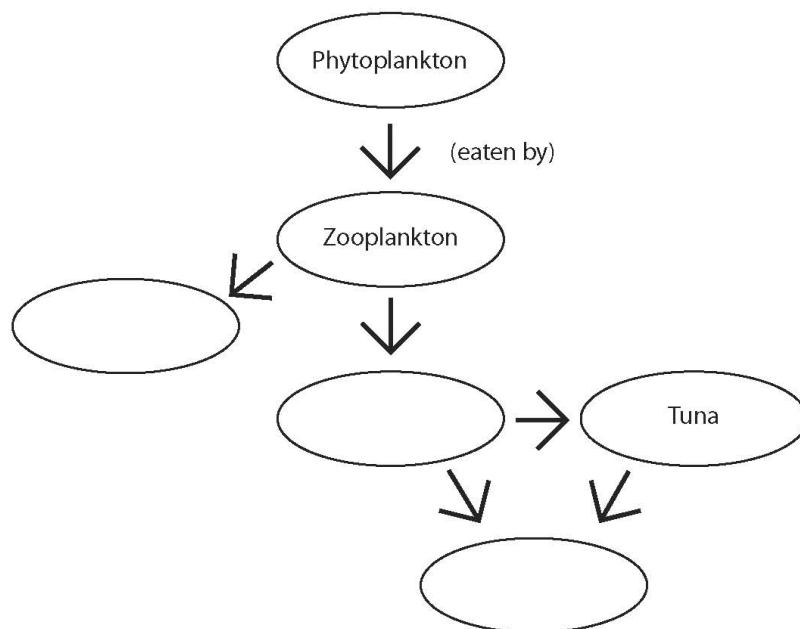
See scoring guide

Look at the list of organisms (plants and animals) below. They all live in the Neritic Zone.

Organism	Description
Phytoplankton	Microscopic plants that photosynthesize
Zooplankton	Microscopic animals that feed on phytoplankton
Tuna	Medium sized fish that feeds on small fish
Herring	Small fish that feeds on zooplankton
Shark	Large fish that feeds on other fish
Whale	Large mammal that feeds on zooplankton

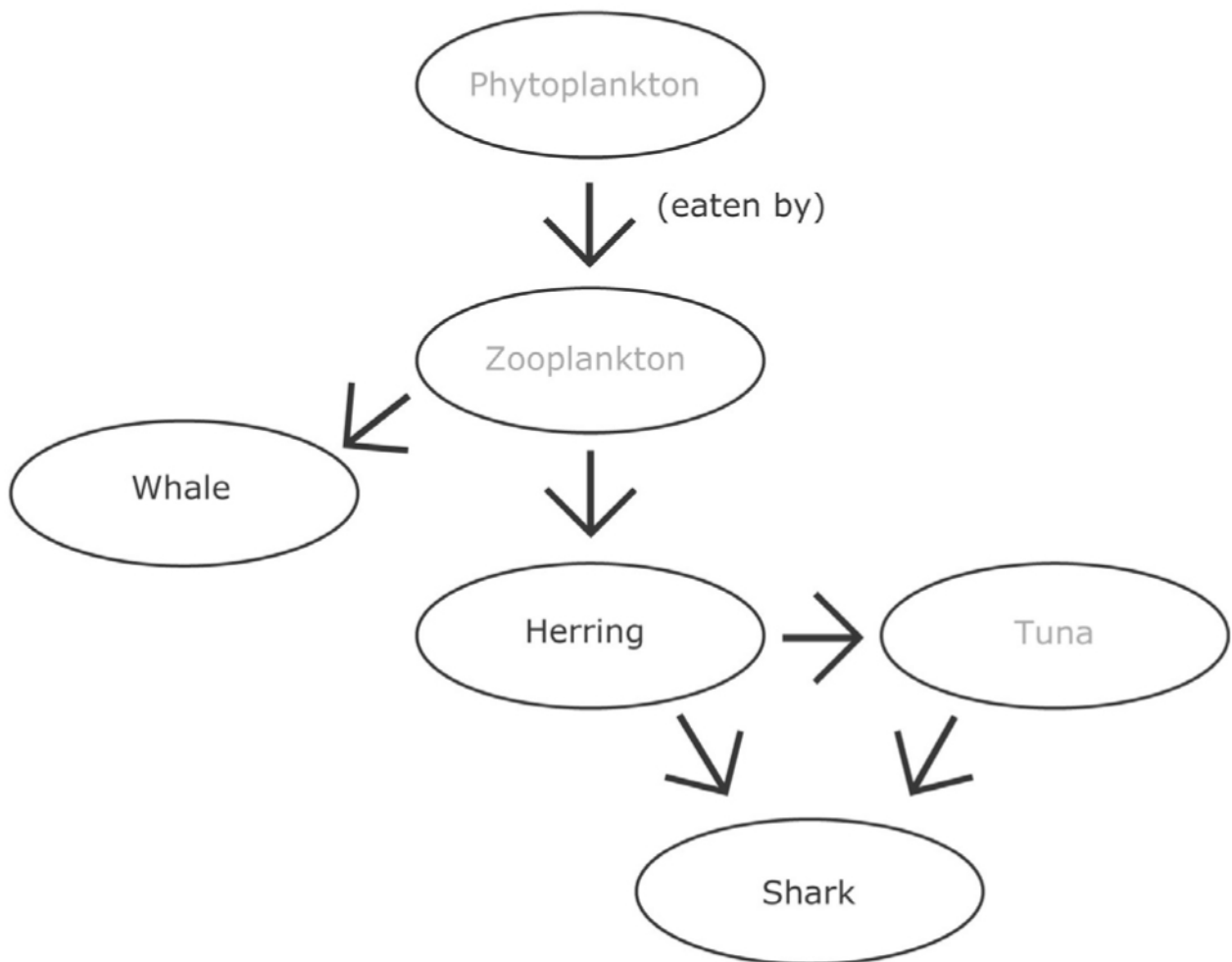
- A. Complete the food web on the chart below to include all the organisms listed in the table. Write the name of one organism in each circle.

The information given about each organism will help you. Three organisms have been placed on the chart for you. The arrows show the direction that energy flows through the food web.



This Life in the Oceans Question continues on the next page. ➡

Code	Response	Item: S032693A
	Correct Response	
10	Fills in food web with all organisms in correct position (as shown in diagram below).	
	Incorrect Response	
70	As in Code 10 but reverses shark and herring.	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	



TIMSS2007**Science****Eighth Grade****Content Domain**

Biology

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

- B. One year tuna becomes scarce because of over-fishing. State what is most likely to happen to the population of sharks and explain your answer.

S032693_2

Questions for Life in the Oceans continue. ➡

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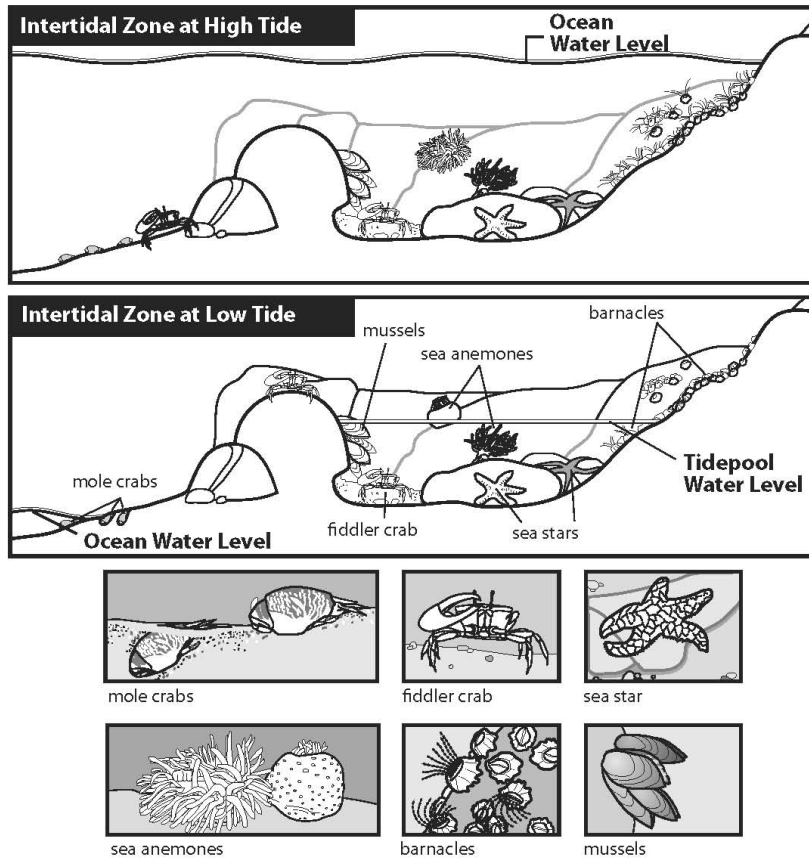
Note: For credit, responses must include an explanation that is consistent with the food web and considers other food sources for the shark. Credit is given for responses that do not consider other food sources but are consistent with the simple food chain (tuna → shark) in the correct food web (Code 10). Any other statement without explanation is scored as incorrect (Code 70). Responses that indicate ONLY that the sharks will become extinct are also scored as incorrect (Code 71). Other correct responses may be possible based on an incorrect food web in Part A. In these cases, the 19 code should be used if the explanation is consistent with the food web.

Code	Response	Item: S032693B
	Correct Response	
10	States that sharks will decrease (or similar) with no further explanation or an explanation based only on the direct effect of tuna. [No consideration of other food sources included.] <i>Examples:</i> <i>The shark population will decrease.</i> <i>The sharks will decrease because they don't have tuna to eat.</i> <i>The sharks will decrease and eventually die because of less food.</i> <i>The sharks will eventually starve to death when there is no food.</i> <i>All the sharks will get hungry and die.</i>	
11	Gives a correct explanation based on the correct food web that considers other food sources for the shark (explicitly or implicitly). <i>Examples:</i> <i>The sharks might have a slight decrease since there is no tuna, but they can also eat the herrings.</i> <i>The shark population stays the same since they will eat other types of food.</i>	
19	Other correct	
	Incorrect Response	
70	States that sharks will increase or stay the same with no explanation (inadequate for evaluating correctness based on food web). <i>Examples:</i> <i>The sharks would stay the same.</i>	
71	States only that sharks will become extinct. [Reflects a misunderstanding of food webs.] <i>Examples:</i> <i>The sharks will become extinct.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

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Science
Eighth Grade

The intertidal zone is found along the ocean shore between the low-tide and high-tide lines. The diagrams below show a cross-section of an intertidal zone at high tide and at low tide and some of the organisms living there.



Questions for Life in the Oceans continue. ➡

Content Domain

Cognitive Domain

Maximum Points

Key

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Science Eighth Grade

The organisms that live in the intertidal zone have special adaptations that allow them to survive the effects of tides.

Select an organism from the intertidal zone. Identify a physical feature or behavior of this organism. Explain how this feature or behavior helps the organism to survive low tide.

Name of organism: _____

Feature or behavior: _____

Explanation:

S032695

Questions for Life in the Oceans continue. ➡

Content Domain

Biology

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

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Note: For full credit, responses must identify an organism in the diagram, describe a feature or behavior of this organism, AND explain how this feature/behavior helps the organism to survive at least one effect of low tide: lack of water, lack of food, exposure to predators or elements, changes in salinity, or effects of wave action. Following is a list of specific features/behaviors expected for each organism and the effect of low tide that the adaptation helps the organism to survive. All of the organisms also have special gill structures that allow them to exchange gases (oxygen/carbon dioxide) with very little water, and this also is to be considered as a correct response.

Sea Anemones	Close up (lack of water, salinity, predators); live in clusters (lack of water reduces exposed body surface area); attach to rocks (wave action)
Mole Crabs	Burrow into the sand (lack of water, predators); hard shell (wave action, lack of water, predators)
Mussels and Barnacles	Attach to rocks (wave action); hard shell (wave action, lack of water, predators); close up (lack of water, salinity, predators); lowers metabolism rate (lack of food, lack of water for removing toxic waste build-up)
Fiddler Crabs	Burrow into sand or crawl into crevices (lack of water, predators); legs/mobility (lack of water/food, predators); hard shell (wave action, lack of water, predators)
Sea Stars	Suction cups/attach to rocks (wave action); tube feet/mobility (lack of water/food, predators, gas exchange); hard/spiny surface (wave action, lack of water, salinity, predators)

Code	Response	Item: S032695
	Correct Response	
20	Identifies an organism, describes a feature/behavior, AND gives an explanation. <i>Examples:</i> <i>Sea anemones. They close up. It keeps them from drying out during low tide.</i> <i>Mole crabs. They dig into the sand. They are not exposed at low tide.</i> <i>Mussels. They have hard shells. They can store water inside their shells.</i> <i>Fiddler crabs. They have legs and can crawl into the tidepool and rocks to find food.</i> <i>Barnacles. They close up and have hard shells. The predators cannot eat them.</i> <i>Sea stars. Suction cups on their legs. Attach to the rocks and not get swept to sea.</i>	
29	Other fully correct	
	Partial Response	
10	Identifies an organism and describes a feature/behavior; NO explanation or inadequate explanation given. <i>Examples:</i> <i>Sea Anemones. They close up; Mole crabs. They can dig into the sand; Mussels. Have shells.</i>	
19	Other partially correct	
	Incorrect Response	
70	Only identifies an organism from the diagram but with no or incorrect description of feature/behavior.	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

S032697

Fewer species of organisms (plants and animals) have been found living in the depths of the oceans than in the regions closer to the surface. Organisms living at the bottom of the ocean must be adapted to the conditions there.

Name two conditions that are found at the bottom of the ocean that make it difficult for most plants and animals to live there.

- 1.
- 2.

End of Life in the Oceans section.

TIMSS2007

Science Eighth Grade

Content Domain

Biology

Cognitive Domain

Applying

Maximum Points

2

Key

See scoring guide

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Note: Each of the two responses is coded separately. Each correct diagnostic code (10,11,12,13) 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 states “the sunlight cannot penetrate that deep” and “not enough light for photosynthesis”, then the first response is given Code 10, and the second is given a Code 79. If only one response is given, the second should be given Code 99.

Code	Response	Item: S032697A,B
	Correct Response	
10	Mentions lack of light.	
11	Mentions low temperatures.	
12	Mentions high pressure.	
13	Mentions lack of food.	
19	Other correct <i>Examples:</i> <i>It is too salty at the bottom, so some species cannot live there.</i> <i>There are poisonous gases from volcanic vents at the bottom of the ocean.</i> <i>Low visibility.</i>	
	Incorrect Response	
70	Mentions only lower oxygen (carbon dioxide, air) levels in deep water. [NOT a general condition found at great ocean depths.] <i>Examples:</i> <i>There would not be enough oxygen for the fish to breathe.</i> Note: While lower oxygen levels do occur in some regions of the ocean, it is not a general condition that exists purely due to depth (gas saturation increases with decreasing temperature and increasing pressure). The level of oxygen is a complex function of depth with a minimum-oxygen zone in the 500 – 1000 meter range, related to the breakdown of organic matter below the photic zone and convection that mixes the deep ocean water. Responses that refer ONLY to low oxygen levels will, therefore, be scored as incorrect. For more sophisticated responses that describe the minimum oxygen zone at intermediate depths, a Code 19 may be given.	
71	Mention only predators (or similar). [NOT specific to the bottom of the ocean.]	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

S042009

In living things, large and complex molecules are broken down into small and simple molecules.

What is this process called?

- (A) excretion
- (B) absorption
- (C) digestion
- (D) circulation

TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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TIMSS2007**Science****Eighth Grade**

S042313

Keith had influenza. He played a game with two friends. One of his friends caught influenza, but the other friend did not.

What could have been the reason why one of the friends did NOT catch influenza?

Content Domain

Biology

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S042313
	Correct Response	
10	<p>Refers either directly or indirectly to the immune system.</p> <p><i>Examples:</i></p> <p><i>He may have had it already.</i></p> <p><i>He was vaccinated.</i></p> <p><i>He has a good immune system.</i></p>	
11	<p>Refers to not being in close contact or taking preventative measures.</p> <p><i>Examples:</i></p> <p><i>He didn't let Keith sneeze on him.</i></p> <p><i>He washed his hands after playing.</i></p> <p><i>He wasn't in contact with his saliva.</i></p> <p><i>He might not have had body contact with Keith.</i></p> <p><i>He may have stayed farther away than the other friend.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>Refers to just being healthier or not getting sick as easily.</p> <p><i>Examples:</i></p> <p><i>His health might be stronger.</i></p> <p><i>Because maybe he doesn't get sick that easily.</i></p>	
71	<p>Refers to having a good diet.</p> <p><i>Examples:</i></p> <p><i>Maybe he eats a balanced diet.</i></p> <p><i>Maybe he eats lots of fruit with vitamins.</i></p>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

Which food contains the highest percentage of protein?

- Ⓐ rice
- Ⓑ dates
- Ⓒ carrots
- Ⓓ chicken

S042059

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

How does the average body temperature of people living in hot climates compare to the average body temperature of people living in cold climates?

(Check one box.)

- ☐ Higher in hot climates
- ☐ Lower in hot climates
- ☐ The same in both climates

Explain your answer.

S042011

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- Note:** i) Explanations that specifically mention the following should receive Code 10:
- a) Humans being warm blooded OR
 - b) Temperature remaining constant at 37 degrees C or 98.4 degrees F OR
 - c) The body only being able to function within a small range of temperatures OR
 - d) References to sweating, shivering, etc., as mechanisms for maintaining constant body temperature. (Responses that only state sweating, shivering, etc. without further explanation should be given code 70).
- ii) If the numerical value is incorrect, but the concept is correct, score as Code 10.

Code	Response	Item: S042011
	Correct Response	
10	<p>The same in both climates with a specific explanation as indicated in the note above.</p> <p><i>Examples:</i></p> <p><i>Humans are warm blooded so they don't rely on the climate to change body temperatures.</i></p> <p><i>The body temperature is the same in all humans.</i></p> <p><i>It's 98.6.</i></p> <p><i>The same in both climates because all body temperatures are around the same degrees.</i></p> <p><i>People in hot climates sweat to maintain their body temperature.</i></p> <p><i>People in hot climates sweat to keep their temperature constant and people in cold climates need to wear much heavier clothing.</i></p>	
	Incorrect Response	
70	<p>The same in both climates with a vague, incorrect or no explanation.</p> <p><i>Examples:</i></p> <p><i>I think it would be the same because your body doesn't change just because of the temperature.</i></p> <p><i>Body temperature is not affected by the surrounding environment.</i></p> <p><i>Sweating.</i></p> <p><i>The people in hot climates will try to keep themselves cool while the people living in cold climates will try to keep themselves warm.</i></p>	
71	<p>Higher in hot climates with or without an explanation.</p> <p><i>Examples:</i></p> <p><i>The blood and body are warmed by the hot climate.</i></p> <p><i>Because in an atmosphere with higher temperature, our body temperature increases too.</i></p> <p><i>The weather is hotter, so the body temperature average will be slightly larger and vice versa with colder climates.</i></p>	
72	<p>Lower in hot climates with or without an explanation.</p> <p><i>Examples:</i></p> <p><i>In hot climates, our bodies will try to adapt to it by giving out heat by the nerves. In cold climates, our bodies will also try to adapt to it by preventing heat loss.</i></p> <p><i>The people living in hot climates need lower body temperature so that they would not feel that hot.</i></p>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

S042028

Which of the following is formed immediately after fertilization?

- (A) egg
- (B) sperm
- (C) zygote
- (D) embryo

TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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TIMSS2007

Science Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

B

An animal has scales and uses only its lungs to exchange gases.

What is the animal most likely to be classified as?

- (A) a fish
- (B) a reptile
- (C) a mammal
- (D) an amphibian

S042001

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S042276

The color of an object such as an apple is the same as the color of the light waves

- (A) that travel through the object
- (B) that are absorbed by the object
- (C) that are reflected by the object
- (D) that travel around the object

TIMSS2007

Science Eighth Grade

Content Domain

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

C

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TIMSS2007**Science****Eighth Grade**

When sound waves with large amplitude are compared to sound waves with small amplitude, which of the following is true?

- Ⓐ Sound waves with large amplitudes have less energy and sound quieter.
- Ⓑ Sound waves with large amplitudes have more energy and sound louder.
- Ⓒ Sound waves with large amplitudes have the same energy and sound quieter.
- Ⓓ Sound waves with large amplitudes have the same energy and sound louder.

Content Domain

Physics

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007

Science

Eighth Grade

Content Domain

Chemistry

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

Thato fell off his bicycle and spilled the bag of salt he was carrying. He collected the salt off the ground together with sand and tree leaves and put the mixture in a plastic bag.



In the table below, describe the steps used by Thato to separate the salt from the mixture of salt, sand, and leaves. State a reason for doing each step. The first step has been done for you.

Step	Description of Step	Reason for Carrying Out the Step
1.	Put the mixture through a sieve.	This will remove the leaves.
2.		
3.		
4.		

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Note: i) Fully correct responses include:

Step 2. Reference to addition of water to dissolve the salt or reference to a salt solution (implies addition of water).

Step 3. Reference to the mixture being filtered (sifted, decanted) to remove the sand.

Step 4. Reference to the salt water being boiled (heated, left out in the sun) to evaporate the water (and leave the salt behind).

ii) Fully correct responses may only use the spaces beside steps 2 and 3.

Code	Response	Item: S042083
	Correct Response	
20	Refers to the processes in steps 2, 3, and 4 as indicated in the note above.	
	Partially Correct Response	
10	<p>Describes a partial method that includes dissolving and/or filtering.</p> <p><i>Examples:</i></p> <p>Step 2. Add water to dissolve salt (correct). Step 3. Pour the water off (correct). Step 4. This will give you salt (incorrect).</p> <p>Step 2. Fill the mixture with water to let the salt dissolve in water (correct). Step 3. Boil the mixture to separate the salt from the sand (incorrect). Step 4. Cool the mixture to prevent the salt from hardening (incorrect).</p> <p>Step 2. Filter the salt solution (correct). Step 3 The sand will be left in the filter (correct).</p>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

The mass of substances A and B are measured on a balance, as shown in Figure 1. Substance B is put into the beaker and substance C is formed. The empty beaker is put back on the balance, as shown in Figure 2.

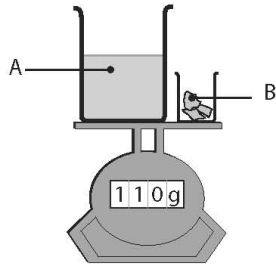


Figure 1

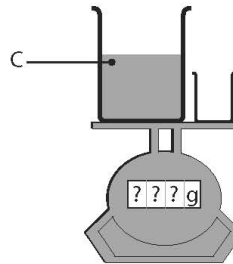


Figure 2

The scale in Figure 1 shows a mass of 110 grams.

What will it show in Figure 2?

(Check one box.)

- ☐ More than 110 grams
- ☐ 110 grams
- ☐ Less than 110 grams

Explain your answer.

Content Domain

Chemistry

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

S042106

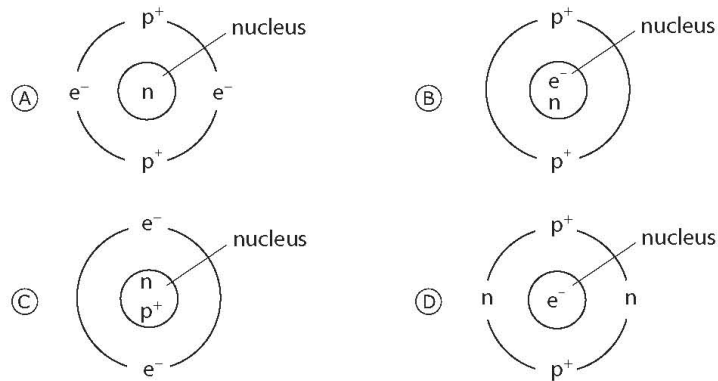
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Code	Response	Item: S042106
	Correct Response	
10	110 grams with an explanation that refers to conservation of mass (or nothing lost or gained). <i>Examples:</i> <i>The mass of the reactants equals the mass of the products.</i> <i>No extra substances were added.</i> <i>If you mix A and B together to get C, the weight will not change.</i>	
11	Less than 110 grams with an explanation that refers to gas production. <i>Examples:</i> <i>Maybe a gas is produced that escapes, so the mass would change.</i>	
	Incorrect Response	
70	110 grams with an incorrect or no explanation. <i>Examples:</i> <i>The same because there is liquid in figure 2.</i>	
71	Less than 110 grams with an incorrect or no explanation. <i>Examples:</i> <i>Figure 2 has no substance B in the beaker. So it may be much lighter than figure 1.</i> <i>Because if the solid B was a solid, it would weigh more.</i>	
72	More than 110 grams with an incorrect or no explanation. <i>Examples:</i> <i>The mass of the solid (B) increases when heated as it expanded. Thus adding on to the weight.</i> <i>Because substance B is mixed with substance A, so I think it will be heavier.</i>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which model shows the correct positions of protons (p^+), electrons (e^-) and neutrons (n) in an atom?



TIMSS2007

Science Eighth Grade

Content Domain

Chemistry

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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TIMSS2007**Science****Eighth Grade****Content Domain**

Chemistry

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

Tom took a glass of milk and tested it with blue litmus paper. The litmus paper stayed blue. After two days, Tom tested the same milk with blue litmus paper again, and the blue litmus paper turned pink.

What kind of change took place in the milk?

(Check one box.)

☐ Chemical change

☐ Physical change

Explain your answer.

S042101

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- Note:** i) If more than one correct response is given, priority should be given to Code 10, then Code 11, then Code 12.
 ii) Responses that check physical change and describe chemical change should receive Code 71.

Code	Response	Item: S042101
	Correct Response	
10	Chemical change and explains that the milk had become acidic. <i>Examples:</i> <i>The acidity changed. This shows that chemical s are reacting which results in the change.</i> <i>The milk has turned acid, thus the litmus paper turned red.</i> <i>The milk changed from a base to an acid.</i> <i>The bacteria in milk turned sugar into acid.</i>	
11	Chemical change and explains that new substances are forming (chemical reaction taking place) OR mentions decomposition/fermentation. <i>Examples:</i> <i>The milk has started to decompose which is a chemical change.</i> <i>The milk became sour and cannot be drunk. A chemical change has occurred because a new substance is formed.</i>	
12	Chemical change and explains that bacteria have grown (and "spoil" the milk). <i>Examples:</i> <i>The milk turned sour from bacteria.</i> <i>Because there were bacteria in it.</i>	
13	Chemical change with an explanation referring to differences between physical and chemical changes. <i>Examples:</i> <i>Chemical changes are irreversible, while physical changes are reversible.</i> <i>The milk cannot be transformed back into its original state, thus it is chemical.</i>	
19	Other correct <i>Examples:</i> <i>The milk would have started to go bad.</i> <i>The milk has spoilt so it is a chemical change.</i>	
	Incorrect Response	
70	Chemical change with an incorrect or no explanation. <i>Examples:</i> <i>The milk was older so it caused the chemicals in the milk to change.</i>	
71	Physical change with or without an explanation. <i>Examples:</i> <i>After 2 days, bacteria have entered the milk, making the milk spoil. Thus there is a change in color and taste of the milk.</i> <i>A physical change took place as the change cannot be reversible.</i>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
99	Blank	

Explain how soil is formed.

S042307

TIMSS2007

Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S042307
	Correct Response	
10	<p>Refers to soil being formed from broken down rocks (minerals, dirt, sand) AND decaying organic materials/plants/animals.</p> <p><i>Examples:</i></p> <p><i>Soil is formed when rocks break and are broken into pieces. They are then mixed with dead plants and animals which have decayed to different nutrients.</i></p> <p><i>When rotting vegetation, dirt, and sand get mixed, it creates soil.</i></p>	
11	<p>Refers to soil being formed from broken down rocks (minerals, dirt, sand).</p> <p><i>Examples:</i></p> <p><i>Rocks deteriorate and break down until it is a soft dirt.</i></p> <p><i>Soil is formed from lots of substances that are rocks, stones, water, and mud.</i></p>	
12	<p>Refers to soil being formed from decaying organic materials/plants/animals.</p> <p><i>Examples:</i></p> <p><i>From decayed materials.</i></p> <p><i>Soil is formed by decomposing plants and animals, which will create a nutritious soil.</i></p> <p><i>It is formed from compost.</i></p>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

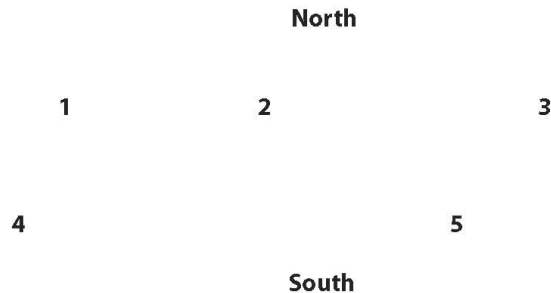
Key

C

Towns 1, 2, and 3 are located north of towns 4 and 5. They are all built on a plain.

It was sunny in town 1 on Monday but was raining in towns 2 and 3.

A wind is blowing in all the towns from the north.

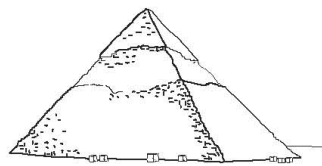


If the wind continues to blow from the north, what will the weather most likely be like in towns 4 and 5 on Tuesday?

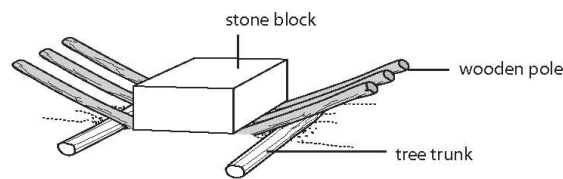
- (A) rainy in both
- (B) sunny in both
- (C) sunny in 4 and rainy in 5
- (D) rainy in 4 and sunny in 5

S042405

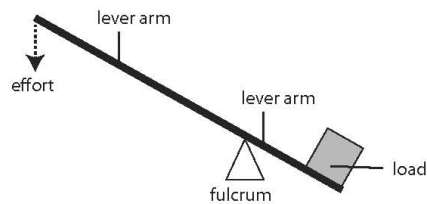
Peter and Joan are learning about the Great Pyramid of Cheops (Khufu) that is found in Egypt.



They wondered how the ancient Egyptians managed to lift the stone blocks to build the pyramid. They did some research on the Internet and found the diagram shown below.



Peter was not sure he understood the diagram so Joan drew a diagram to help him understand how the stone was lifted. Her diagram is shown below.



A. Match the parts of the Egyptian levers to the diagram of the lever Joan drew. One has been done for you.

Joan's Diagram	Egyptian Levers
Effort	Downward pull of the worker
Load	
Fulcrum	
Lever arm	

Code	Response	Item: S042244A										
	Correct Response											
10	Matches three parts of the lever correctly as shown below.											
	<table><tr><th>Joan's Diagram</th><th>Egyptian Levers</th></tr><tr><td>Effort</td><td>Downward pull of worker</td></tr><tr><td>Load</td><td>stone block (stone)</td></tr><tr><td>Fulcrum</td><td>tree trunk (tree)</td></tr><tr><td>Lever arm</td><td>wooden pole (wood)</td></tr></table>		Joan's Diagram	Egyptian Levers	Effort	Downward pull of worker	Load	stone block (stone)	Fulcrum	tree trunk (tree)	Lever arm	wooden pole (wood)
Joan's Diagram	Egyptian Levers											
Effort	Downward pull of worker											
Load	stone block (stone)											
Fulcrum	tree trunk (tree)											
Lever arm	wooden pole (wood)											
	Incorrect Response											
70	Matches two parts of the lever correctly.											
71	Matches one part of the lever correctly.											
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)											
	Nonresponse											
99	Blank											

Content Domain
Physics

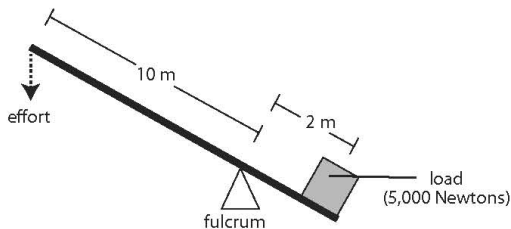
Cognitive Domain
Applying

Maximum Points
1

Key
See scoring guide

B. Peter and Joan read that six men could together lift a stone weighing 30,000 Newtons. Each man would then need to be able to lift one sixth of this weight (5,000 Newtons). They decided to work out how much effort each man had to exert on his wooden pole.

Peter added the length of each lever arm to Joan's diagram as shown below.



He looked up the following formula in a textbook:

$$\frac{\text{force exerted by load}}{\text{force exerted by effort}} = \frac{\text{length between effort and fulcrum}}{\text{length between load and fulcrum}}$$

How much force does each man have to exert to lift the block?

_____ Newtons

Code	Response	Item: S042244B
	Correct Response	
10	1,000 Newtons.	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

S042153

Explain why recycling household materials such as plastics, cans, and paper is important.

TIMSS2007

Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S042153
	Correct Response	
10	<p>Refers to not wasting natural resources.</p> <p><i>Examples:</i></p> <p><i>So you won't be wasting resources.</i></p> <p><i>So that our resources last longer.</i></p> <p><i>So we don't use up all the fossil fuels.</i></p> <p><i>So they can be reused and we won't waste as much material.</i></p>	
11	<p>Refers to reducing pollution (air, water, land) and/or the amount of material going into landfills.</p> <p><i>Examples:</i></p> <p><i>Most materials can be recycled and recycling will reduce the amount of rubbish in landfill sites and will cut down on air, environmental, and visual pollution.</i></p> <p><i>Recycling is important because we don't have as much pollution.</i></p> <p><i>So we can reduce the amount of trash and we form compost soil (very good) for plants.</i></p> <p><i>They decompose very slowly, some of them never.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>Refers to environmental protection.</p> <p><i>Examples:</i></p> <p><i>We save the environment.</i></p> <p><i>Environment protection.</i></p>	
71	<p>Refers to reusing materials only.</p> <p><i>Examples:</i></p> <p><i>The materials can be reused.</i></p> <p><i>Because if you recycle them they can collect them and use them again.</i></p> <p><i>Because they can be broken down and made into something else.</i></p>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

S022183

Which gas could cause rust to form on a metal can?

- (A) Hydrogen
- (B) Oxygen
- (C) Nitrogen
- (D) Helium

Content Domain

Chemistry

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007

Science

Eighth Grade

Content Domain

Chemistry

Cognitive Domain

Knowing

Maximum Points

1

Key

A

Sally placed electrodes into a beaker containing a solution and connected the electrodes to a battery. Part of Sally's report stated "Bubbles were given off at one of the electrodes."

This statement is

- Ⓐ an observation
- Ⓑ a prediction
- Ⓒ a conclusion
- Ⓓ a theory
- Ⓔ a hypothesis

S022276

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TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Reasoning

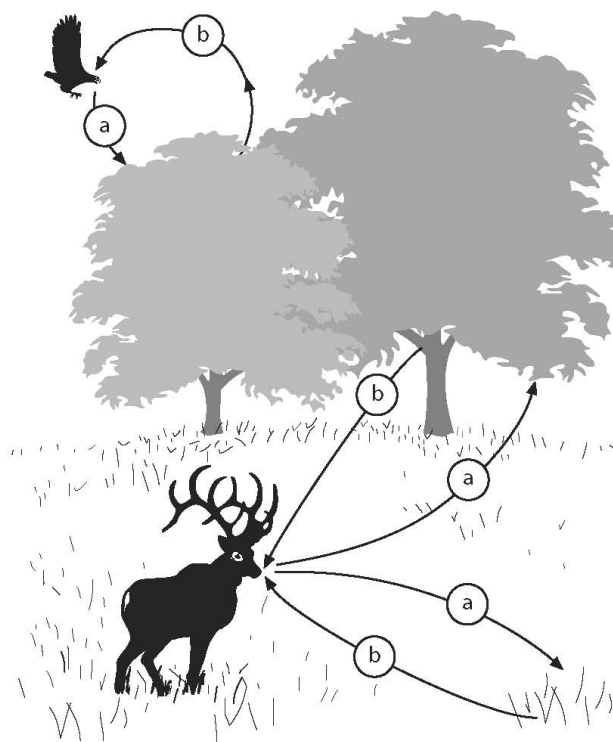
Maximum Points

1

Key

D

The diagram below shows an example of interdependence among organisms. During the day the organisms either use up or give off (a) or (b) as shown by the arrows.



Choose the right answer for (a) and (b) from the alternatives given.

- (A) (a) is carbon dioxide and (b) is nitrogen.
- (B) (a) is oxygen and (b) is carbon dioxide.
- (C) (a) is carbon dioxide and (b) is water vapor.
- (D) (a) is carbon dioxide and (b) is oxygen.

S022115

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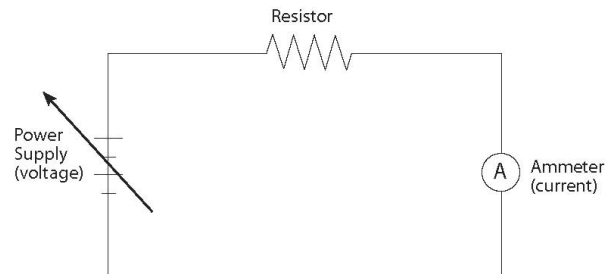
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TIMSS2007

Science

Eighth Grade

Some students used an ammeter (A) to measure the current in a circuit for different voltages.



The table shows some of the results. Complete the table.

Voltage (Volts)	Current (milliamperes)
2	15
4	30
	60

Content Domain

Physics

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: S022022
	Correct Response	
10	8	
	Incorrect Response	
70	6	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade****Content Domain**

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

C

In a deep valley on Earth, a person shouting will hear an echo as the sound is reflected back off the surrounding mountains. In a similar valley on the Moon, no echo will be heard. This is because

- Ⓐ the gravitational pull on the Moon is too low
- Ⓑ the temperature on the Moon is too low
- Ⓒ there is no air on the Moon for the sound to travel through
- Ⓓ the mountains on the Moon cannot reflect sound

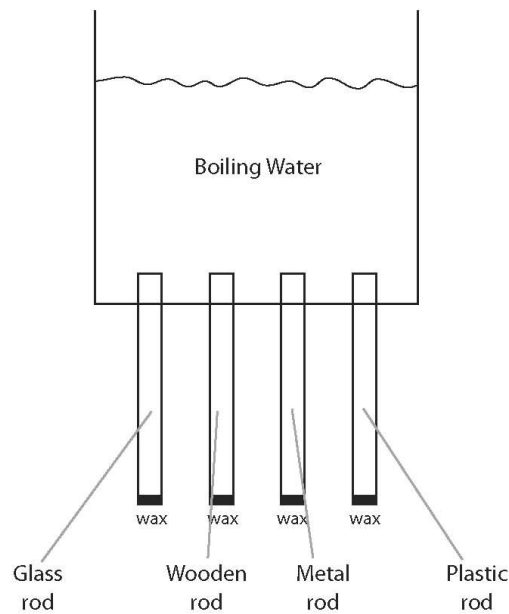
S022019

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TIMSS2007

Science
Eighth Grade

The diagram shows four identical size rods each of a different material sealed into the bottom of a container. The same amount of wax is placed on the end of each rod and then the container is filled with boiling water. On which rod will the wax melt first?

- (A) Glass rod
- (B) Wooden rod
- (C) Metal rod
- (D) Plastic rod

Content Domain

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

C

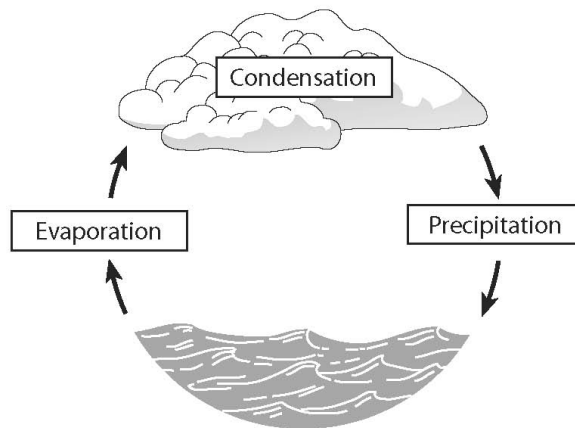
S022002

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The diagram below shows Earth's water cycle.



What is the source of energy for the water cycle?

- (A) The Moon
- (B) The Sun
- (C) The tides
- (D) The wind

S022294

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TIMSS2007

Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

B



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S022106

Which of the following animals have been on Earth for the longest period of time?

- (A) Humans
- (B) Birds
- (C) Fish
- (D) Reptiles

TIMSS2007

Science
Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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The Central City Power Station burns coal to generate power for the city. As the coal burns, sulfur that is present in the coal reacts with oxygen to form sulfur dioxide, which is given off as a gas.

How does this process result in acid rain?

S022244

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TIMSS2007**Science****Eighth Grade****Content Domain**

Earth Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide



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Note: To receive credit, responses must include some reference to a chemical reaction of sulfur dioxide in the atmosphere or an interaction involving sulfur dioxide and water (clouds) in the atmosphere (mixing, dissolving, etc.). Naming a specific acid formed (sulfuric or sulfurous) is not required to receive a Code 10.

Code	Response	Item: S022244
	Correct Response	
10	<p>Refers to a chemical reaction of sulfur dioxide (with water) in the atmosphere (to form acid).</p> <p><i>Examples:</i></p> <p><i>The sulfur dioxide changes into sulfuric acid when it combines with water in the atmosphere.</i></p> <p><i>The sulfur dioxide reacts with water vapor in clouds to form acid.</i></p> <p><i>A reaction takes place when sulfur dioxide mixes with the clouds.</i></p> <p><i>The sulfur dioxide changes to sulfuric acid when it reacts with the air.</i></p> <p><i>A reaction takes place when sulfur dioxide gets into the atmosphere.</i></p>	
11	<p>Refers only to the mixing or dissolving of the sulfur dioxide in the water (or clouds) in the atmosphere. (No explicit mention of a reaction).</p> <p><i>Examples:</i></p> <p><i>The gas mixes in the water vapor. Then when the vapor condenses, it falls with the water making acid rain.</i></p> <p><i>The sulfur dioxide has acid in it, and that goes into the clouds and rains down.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>Refers only to the evaporation and/or formation of sulfur dioxide clouds. (Confuses acid rain with steps of water cycle; no mention of mixing with water or clouds).</p> <p><i>Examples:</i></p> <p><i>When it evaporates, it forms clouds and generates acid rain.</i></p> <p><i>The gas rises and when there is too much, it rains.</i></p> <p><i>The sulfur dioxide condenses to form clouds of acid rain.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Applying

Maximum Points

1

Key

A

In living organisms, the level of organization from least complex to most complex is

- Ⓐ cell, tissue, organ, organism
- Ⓑ cell, organ, tissue, organism
- Ⓒ tissue, cell, organ, organism
- Ⓓ tissue, organ, cell, organism

S022150

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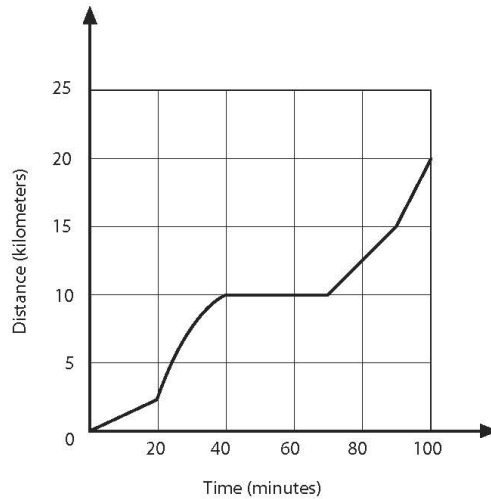
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TIMSS2007

Science

Eighth Grade

Mary went for a cycle ride during which she had a puncture. She repaired it straight away and immediately continued her ride. The graph shows the progress she made during the ride.



About how long did it take Mary to mend the puncture?

- (A) 20 minutes
- (B) 30 minutes
- (C) 40 minutes
- (D) 70 minutes

S022042

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Content Domain

Physics

Cognitive Domain

Reasoning

Maximum Points

1

Key

B



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Explain why your heart beats faster when you exercise.

S022289

TIMSS2007

Science
Eighth Grade

Content Domain

Biology

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide



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Note: A fully correct response must include the following elements relating the change in heart rate to the physiological needs during exercise and the role of the circulatory system:

- i) need for more oxygen, energy, food, waste product removal, etc., during exercise
- ii) role of circulatory system (increased blood flow to meet the needs during exercise).

Partial credit is given for responses including some reference to either the physiological needs during exercise (i) OR the circulatory system (ii).

Code	Response	Item: S022289
	Correct Response	
20	Response includes BOTH elements (i) and (ii) above. <i>Examples:</i> <i>Your heart has to pump more blood because your cells need more oxygen during exercise.</i> <i>Your blood is moving faster to carry oxygen to your cells and carry away wastes.</i>	
29	Other fully correct	
	Partial Response	
10	Response includes element (i) only (need for oxygen, energy, etc., without mentioning blood circulation). <i>Examples:</i> <i>The body needs more oxygen and energy.</i> <i>The heart pumps faster to supply more oxygen.</i>	
11	Response includes element (ii) only (increased blood flow without mentioning the need for more oxygen, energy, etc.) <i>Examples:</i> <i>The heart pumps blood faster.</i> <i>The blood flows faster.</i>	
12	Refers to the need for air rather than oxygen (with or without mention of blood). <i>Examples:</i> <i>When I exercise, my heart needs to pump more air to my muscles.</i>	
19	Other partially correct	
	Incorrect Response	
70	Mentions ONLY an effect due to exercise (working hard, straining the body, speeding up of bodily processes, breathing hard, etc.) without mentioning physiological needs or blood circulation. <i>Examples:</i> <i>Because of the exercise, you are pushing your body.</i> <i>When you exercise your pulse rate always increases.</i> <i>Everything speeds up when you exercise hard.</i> <i>You start breathing faster and faster.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

Content Domain

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

James put a pot of water on the stove and heated it. He took the temperature of the water as soon as it started to boil. The thermometer showed 100° C. James turned the heat up and the water continued to boil for 5 minutes. He then took the temperature of the boiling water again.

Would the thermometer show a temperature greater than, less than, or equal to 100° C?

Answer: _____

Explain your answer.

S022069

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Note: A correct response must indicate 100° C (equal, same) and include a correct explanation based on water boiling (phase change) occurring at a constant temperature.

Code	Response	Item: S022069
	Correct Response	
10	100° C (equal). With a correct explanation based on water boiling at a constant temperature. <i>Examples:</i> <i>Equal. The boiling point of water is 100 degrees.</i> <i>100° C. Because that is the highest boiling point.</i> <i>Equal. Water boils at 100° C no matter what.</i> <i>Equal. It only takes 100° C to boil water. The excess energy evaporates the water.</i> <i>Equal. Because it is still at its boiling point of 100° C.</i>	
	Incorrect Response	
70	100° C (equal). With no explanation or an incorrect explanation. <i>Examples:</i> <i>Equal. Not enough time to heat up.</i> <i>100° C. Because that is how high the thermometer goes.</i>	
71	Greater than 100° C. With no explanation or an incorrect explanation. <i>Examples:</i> <i>Greater. Because if he heated it again it would still be hot from last time.</i> <i>Greater. Because it was on there longer.</i> <i>Greater. Because the heat went up.</i> <i>Greater. Because he turned the temperature up on the elements.</i> <i>Greater. That is the boiling point. If he left it long enough it would evaporate.</i> <i>Greater. It goes up every second.</i> <i>Greater. The boiling point is 100° C, but it can still get hotter before it evaporates.</i> <i>Greater. Boiling water can reach temperatures of 100° C.</i>	
72	Less than 100° C. With no explanation or an incorrect explanation. <i>Examples:</i> <i>Less. Because if it is not boiling, it is below the boiling point of 100° C.</i> <i>Less. As the water boils away, the boiling point drops.</i> <i>Less. It is not on the heat anymore.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade****Content Domain**

Physics

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

Pauline took two small identical containers and filled them with the same amount of water. She dissolved a tablespoon of salt in one of them and placed both containers in a freezer. Pauline then observed them every five minutes until one of them had frozen.

What can Pauline find out from her experiment?

S022268

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Note: To receive credit, responses must be related to the relative rates of freezing for fresh and salt water. Responses may include either a statement of the problem being investigated in the experiment (determining the effect of salt on the freezing point (rate) of water) for Code 10 or a conclusion based on prior scientific knowledge (e.g. the fresh water will freeze first) for Code 11. Explanations based on knowledge of practical applications of salt lowering the freezing point of water should be given Code 19.

Code	Response	Item: S022268
	Correct Response	
10	Response includes a statement of the problem: determining the effect of (dissolved) salt on freezing (point, rate, temperature) of water. <i>Examples:</i> <i>Find out if salt affects freezing water.</i> <i>She can find out which container freezes first.</i> <i>She can find out if water freezes easier with dissolved salt or without dissolved salt.</i>	
11	Response includes a conclusion of the relative rates of freezing (or freezing points, temperatures) based on prior scientific knowledge. <i>Examples:</i> <i>Regular water will freeze before salt water will.</i> <i>The salt water will not be frozen yet.</i>	
19	Other correct	
	Incorrect Response	
70	States that the salt water would freeze first. <i>Examples:</i> <i>Salt water will freeze first because it has a solid in it.</i> <i>The plain water will not be frozen yet.</i>	
71	States that salt water will never freeze (or similar). [Extrapolation beyond the conditions of experiment.] <i>Examples:</i> <i>The container with salt in it will never freeze.</i> <i>Salt water cannot freeze because of the salt crystals.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

B

Cells that conduct messages are known as

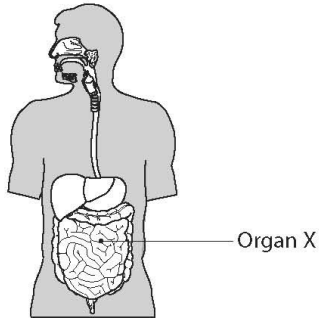
- (A) skin cells
- (B) nerve cells
- (C) blood cells
- (D) kidney cells

S042013

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TIMSS2007**Science****Eighth Grade**

What is organ X?

- (A) liver
- (B) stomach
- (C) small intestine
- (D) large intestine

S042006

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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TIMSS2007

Science

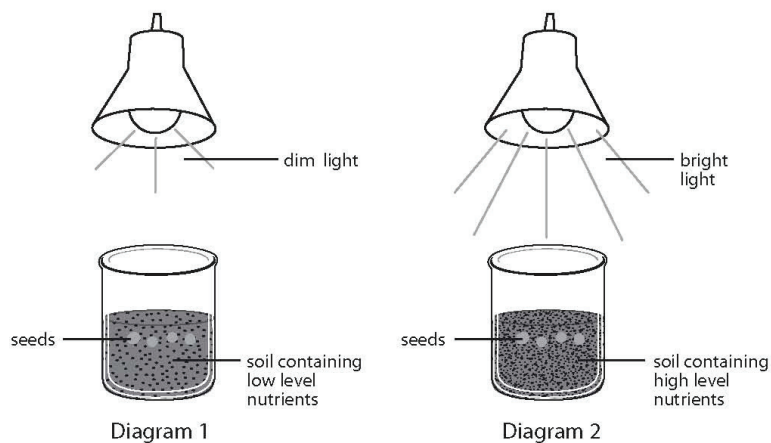
Eighth Grade

Fred has a packet of pea seeds that are genetically identical.

They are a variety of peas that produce tall stemmed pea plants.

He plants four pea seeds in a container in the conditions shown in Diagram 1.

He plants four more pea seeds in a container in the conditions shown in Diagram 2. He waters the seeds every day.



What can be predicted about the height of the pea plants?

Explain your answer.

Content Domain

Biology

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide



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Code	Response	Item: S042310
	Correct Response	
20	<p>Predicts that plants in diagram 2 may grow taller than plants in diagram 1. Explanation refers to BOTH light and nutrients.</p> <p><i>Examples:</i></p> <p><i>The height of the pea plants will be higher in the second container. The bright light will give the plants energy and the nutrients in the soil will help the peas grow.</i></p> <p><i>I predict that the peas in diagram 2 will grow higher. It has more nutrients and more light.</i></p>	
	Partially Correct Response	
10	<p>Predicts that plants in diagram 2 may grow taller than plants in diagram 1. Explanation refers to light OR nutrients OR mentions that diagram 2 has more basic necessities.</p> <p><i>Examples:</i></p> <p><i>Diagram 2 will grow taller. This is because it has more light and plants make food using light.</i></p> <p><i>The pea plants with the bright light shining on them will grow faster than the pea seeds with the dim light.</i></p> <p><i>The peas will grow taller in diagram 2 because there are more nutrients to help with growth.</i></p> <p><i>Diagram 2 has more basic necessities than diagram 1.</i></p>	
	Incorrect Response	
70	<p>Predicts that plants in diagram 1 may grow taller than plants in diagram 2. Explanation refers to a low intensity of light causing spindly (leggy) growth.</p> <p><i>Examples:</i></p> <p><i>The pea plants under dim light grow a long stem because of the dim light.</i></p>	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Eighth Grade

A city was built for half a million people, but now its population is predicted to increase to 1 million over the next 10 years.

Describe two environmental problems that the city might face because of the increasing population.

1.

2.

S042052

Content Domain

Biology

Cognitive Domain

Applying

Maximum Points

2

Key

See scoring guide

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- Note:** i) Accepted environmental problems faced by the city are:
 Increased (air) pollution (due to such things as increased exhaust fumes)
 Increased noise pollution
 Increased waste
 Lack of (clean) water (water pollution)
 Lack of waste disposal facilities
 Increased diseases (or spread of diseases)
 Lack of space for living (overcrowding) - including destruction of "green" spaces
- ii) If responses mention lack of food, code as incorrect.

Code	Response	Item: S042052
	Correct Response	
20	Mentions two environmental problems. <i>Examples:</i> 1. Air pollution would be a problem. 2. Water pollution would be another factor. 1. Pollution and exhaust. 2. No space.	
	Partially Correct Response	
10	Mentions one environmental problem. <i>Examples:</i> 1. Lack of food (incorrect). 2. More waste produced (correct). 1. Increased spread of diseases (correct). 2. Not enough jobs (incorrect).	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

Which of the following is caused by a virus?

- Ⓐ ulcer
- Ⓑ malaria
- Ⓒ tuberculosis
- Ⓓ influenza

S042054

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Applying

Maximum Points

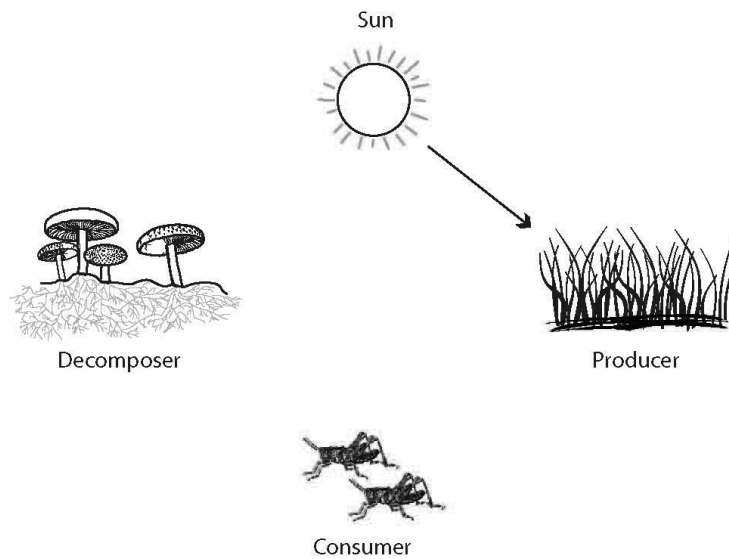
1

Key

See scoring guide

On the diagram below, draw arrows to indicate the direction energy flows among producers, consumers, and decomposers.

The arrow shows the direction of energy flow from the sun to the producer.

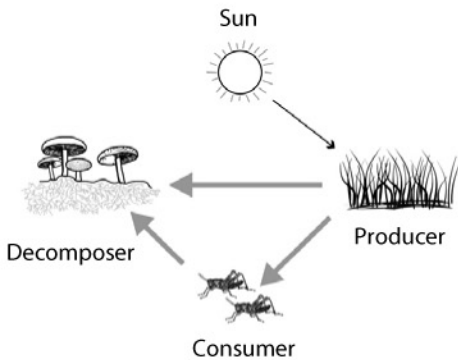


S042043

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Code	Response	Item: S042043
	Correct Response	
10	<p>Three correct arrows are drawn as shown below: There are no incorrect arrows.</p> 	
11	Draws two correct arrows. There are no incorrect arrows.	
	Incorrect Response	
70	<p>Arrows are pointing in the wrong direction:</p> <ul style="list-style-type: none"> Consumer to producer Decomposer to producer Decomposer to consumer 	
71	Draws one correct arrow. There are no incorrect arrows.	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Homes are wired for electricity using parallel circuits not series circuits.
What is the **advantage** of using parallel circuits in homes?

S042196

TIMSS2007

Science Eighth Grade

Content Domain

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

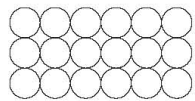
See scoring guide

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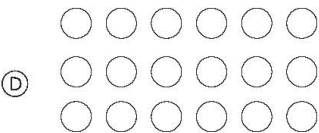
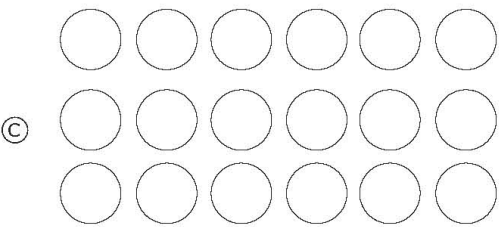
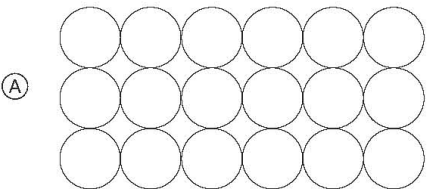
Code	Response	Item: S042196
	Correct Response	
10	<p>Mentions that either</p> <p>i) a parallel circuit has more than one pathway for the current to flow through and if one pathway is switched off the other pathways will still work OR</p> <p>ii) if an appliance does not work (or the fuse breaks) the other appliances can still be used.</p> <p><i>Examples:</i></p> <p><i>If there is a fault in one of the circuits, the rest of them can still function as usual.</i></p> <p><i>We are able to turn on different appliances at different times to our liking.</i></p> <p><i>If a light bulb goes out, the other bulbs stay on.</i></p> <p><i>If one electrical appliance is spoiled, the others can still be used.</i></p> <p><i>If one bulb or appliance is faulty, it will not interrupt the circuit.</i></p>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

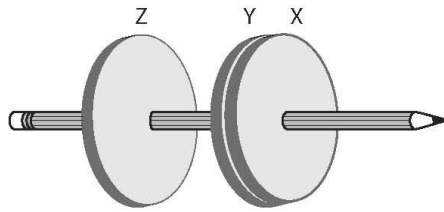
Content Domain
Physics
Cognitive Domain
Applying
Maximum Points
1
Key
D

The diagram represents the arrangement of particles in a metal before it has been heated.



Which diagram represents the arrangement of particles in the metal after it has been heated?





The diagram shows what happens to three magnets when they are placed close together on a pencil.

Magnets X and Y move until they touch each other, but magnets Y and Z remain separated.

1. Explain why magnets X and Y touch each other.

2. Explain why magnets Y and Z remain separated.

S042292

TIMSS2007**Science**
Eighth Grade**Content Domain**

Physics

Cognitive Domain

Applying

Maximum Points

2

Key

See scoring guide

Note: If the diagram is correctly labeled with N and S, but the explanation is minimal or not provided, code as 20.

Code	Response	Item: S042292
	Correct Response	
20	Refers to unlike poles (NS or SN) AND like poles (NN or SS). Attraction and repulsion may or may not be mentioned. <i>Examples:</i> 1. Magnets X and Y touch each other because the north and south poles were facing. 2. Magnets Y and Z remain separated because they may have had south and south or north and north facing each other. 1. Magnets X and Y attract each other as they have unlike poles facing each other. 2. Magnets Y and Z repel as they have like poles facing each other.	
	Partially Correct Response	
10	Refers to unlike poles (NS or SN) OR like poles (NN or SS). Attraction and repulsion may or may not be mentioned. <i>Examples:</i> 1. Side Y is facing side X (incorrect). 2. The side of Y facing Z has the same, e.g. south and south (correct). 1. Magnets X and Y attract because they aren't the same (correct). 2. Magnets Y and Z remain separated because they are north and south (incorrect).	
11	Mentions attraction and/or repulsion but does not explain why. <i>Examples:</i> 1. Magnets X and Y touch each other because the magnetic forces pull the magnets together. 2. Magnets Y and Z remain separated because the magnetic forces push apart. 1. Magnets X and Y touch each other because specific sides of a magnet attract. 2. Magnets Y and Z remain separated because specific sides of a magnet resist.	
	Incorrect Response	
70	Responses reverse the the poles (i.e., like poles attract and unlike poles repel). <i>Examples:</i> 1. Magnets X and Y touched together because they found south and south together. 2. Magnets Y and Z remained separate because they were north and south.	
71	Responses refer to negative and positive sides. <i>Examples:</i> 1. Magnets X and Y have opposite sides that faced each other so they connected. 2. Magnets Y and Z have the same side, either negative or positive facing each other so they didn't connect.	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which substance is necessary for burning to take place?

- (A) ozone
- (B) oxygen
- (C) hydrogen
- (D) carbon dioxide

S042109

TIMSS2007**Science****Eighth Grade****Content Domain**

Chemistry

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007

Science

Eighth Grade

Content Domain

Chemistry

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

A science class had been assigned to find the density of a can that holds soda. Four groups were formed to do the task. Each group was given a can of soda.

After each group had completed its work, they presented their results, as shown in the table below.

	Group A	Group B	Group C	Group D
Density (g/mL)	1.04	0.04	2.77	1.05

The class was surprised that the results for the densities of the can were so different.

They looked at the methods each group had used to find the mass and the volume of the soda can.

Table 1 shows how each group found the mass of the soda can.

Table 1: Mass

Group	Method	Mass (g)
A	We used a balance to find the mass of the can of soda.	389.30
B	We opened the can and emptied it. We used a balance to find the mass of the soda can.	13.85
C	We opened the can and emptied it. We used a balance to find the mass of the soda can.	13.85
D	We used a balance to find the mass of the can of soda.	389.30

A. Explain why groups A and D and groups B and C found different results for the mass.

S042232_1

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Note: The comparison can be of two types: Specific or general.

i) Specific comparison: Groups A and D measured the mass of the **can and soda** while Groups B and C measured the mass of the **can**.

ii) General comparison: Some groups did not empty the can before measuring the mass (while other groups did).

Code	Response	Item: S042232A
	Correct Response	
10	<p>Makes a specific OR a general comparison as indicated in the note above.</p> <p><i>Examples:</i></p> <p><i>A and D mass contained soda mass but B and C mass contained no soda so the mass is different.</i></p> <p><i>Groups A and D found the mass of the whole soda can while Groups B and C found the mass of the can only.</i></p> <p><i>Groups A and D did not empty the cans first while Groups B and C did.</i></p> <p><i>Groups A and D did not empty the can. Therefore they have results that differ from B and C.</i></p> <p><i>Groups A and D found the mass of the can and soda.</i></p> <p><i>Two groups did not empty the soda out while the other two groups did.</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>Groups A and D did not open the can.</i></p>	
	Nonresponse	
99	Blank	

<p>Content Domain</p> <p>Chemistry</p>
<p>Cognitive Domain</p> <p>Reasoning</p>
<p>Maximum Points</p> <p>1</p>
<p>Key</p> <p>See scoring guide</p>

B. Table 2 shows how each group found the volume of the soda can.

Table 2: Volume

Group	Method	Volume (mL)
A	We filled the beaker to the 1400 mL mark. We put the unopened can into the beaker. The can sank. Then the water level was 1776 mL.	376.00
B	We filled the beaker to the 1400 mL mark. We put the emptied can straight down into the beaker with the open side down. We kept the can underwater by holding it down with a pencil. Then the water level was 1776 mL.	376.00
C	We filled the beaker to the 1600 mL mark. We put the emptied can into the beaker open side up. We held it under the water and saw bubbles come out of the can. When no more bubbles came out of the can, it sank to the bottom and the water level was 1605 mL.	5.00
D	We opened the can and used the graduated cylinder to measure the volume of soda in the can.	371.00

Groups B and C tried to measure the volume of the can without soda.
Explain why their results are different.

Code	Response	Item: S042232B
	Correct Response	
10	<p>Explains that either</p> <p>i) the measurement of Group B included the volume of air whereas the measurement of group C did not include the volume of air OR</p> <p>ii) Group B measured the volume of the metal and air while Group C measured the volume of the metal only.</p> <p><i>Examples:</i></p> <p><i>Group B measured the volume of the can filled with air. The result included the volume of air.</i></p> <p><i>Group C measured the volume of the can. The result did not include the volume of the air.</i></p> <p><i>Group B placed the emptied can straight into the water so air was trapped inside the can. But Group C allowed the air bubbles to escape thus getting the volume of the metal the can was made of but not the volume of air.</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>Group C – water entered the can. Group B – water didn't enter the can, so the volume was bigger.</i></p>	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

C. The table below shows the mass, volume, and density results for each group.

Group	A	B	C	D
Mass (g)	389.30	13.85	13.85	389.30
Volume (mL)	376.00	376.00	5.00	371.00
Density (g/mL)	1.04	0.04	2.77	1.05

Based on the methods used, which group found the density of the metal from which the can was made?

- Ⓐ Group A
- Ⓑ Group B
- Ⓒ Group C
- Ⓓ Group D

S042232_3

Content Domain

Chemistry

Cognitive Domain

Reasoning

Maximum Points

1

Key

C

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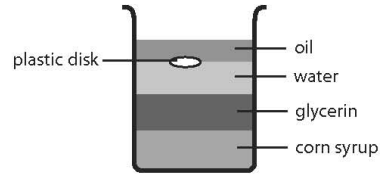
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TIMSS2007

Science

Eighth Grade

Abiodiu poured corn syrup into the bottom of an empty beaker. He carefully added a layer of glycerin, water, and oil, as shown in the diagram. He then dropped a plastic disk into the beaker.



Which statement is true?

- (A) Oil is more dense than corn syrup.
- (B) Plastic is less dense than oil.
- (C) Glycerin is more dense than oil.
- (D) Corn syrup is less dense than water.

Content Domain

Physics

Cognitive Domain

Reasoning

Maximum Points

1

Key

C

S042149

Describe one way groundwater can become polluted.

TIMSS2007

Science
Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Note: Accepted ways that groundwater can become polluted include reference to:

Pesticides

Fertilizers

Factory waste

Chemicals (salt)

Landfills (rubbish, garbage)

Acid rain

Sewage

Oil

Leaking pipes

Code	Response	Item: S042149
	Correct Response	
10	<p>Describes one way that groundwater can become polluted.</p> <p><i>Examples:</i></p> <p><i>Pesticides used by the farmers can leak into the ground with rainwater.</i></p> <p><i>Disposing of factory waste in water.</i></p> <p><i>We bury our litter and waste underground by landfill.</i></p> <p><i>Acid rain can make water acidic.</i></p> <p><i>Things get absorbed by the soil and seep into the water.</i></p> <p><i>Because at dump sites toxic items can be dumped on the land and the toxic liquid absorbed into the ground.</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 dirt can become mixed with the water.</i></p> <p><i>When stuff is put down sewers and pollutes it.</i></p> <p><i>Because of the drains.</i></p> <p><i>It can get dirty.</i></p> <p><i>Gases in the air turn to vapor.</i></p>	
	Nonresponse	
99	Blank	

S042155

Explain why soil erosion can be reduced by planting trees.

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TIMSS2007

Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide



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Note: Accepted explanations include:
 Tree roots bind the soil together.
 Trees absorb a lot of rainwater.
 Trees shelter the soil from water.
 Trees act as a windbreak.

Code	Response	Item: S042155
	Correct Response	
10	<p>Refers to one of the explanations as listed in the note above.</p> <p><i>Examples:</i></p> <p><i>The tree's roots grasp hold of soil tightly preventing soil erosion.</i></p> <p><i>The roots will absorb a lot of the rainwater.</i></p> <p><i>The trees will protect the soil by covering it.</i></p> <p><i>A stand of trees will act as a barrier to the wind.</i></p> <p><i>The trees will protect the soil from too much wind.</i></p> <p><i>The roots of the tree are strong enough to hold the soil in place. So when there is a heavy flood, soil erosion can be prevented as the roots are holding on.</i></p>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

Which resource is nonrenewable?

- Ⓐ petroleum
- Ⓑ sand
- Ⓒ wood
- Ⓓ oxygen

S042150

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

A

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Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

D

An Earth year is the length of time it takes for

- Ⓐ Earth to rotate once on its axis
- Ⓑ the Moon to revolve once around Earth
- Ⓒ the Sun to revolve once around Earth
- Ⓓ Earth to revolve once around the Sun

S022290

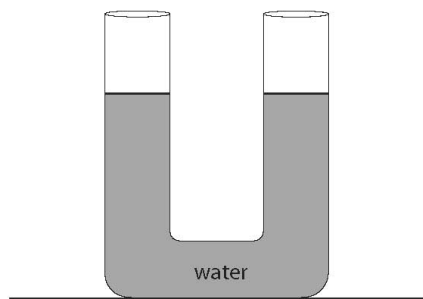
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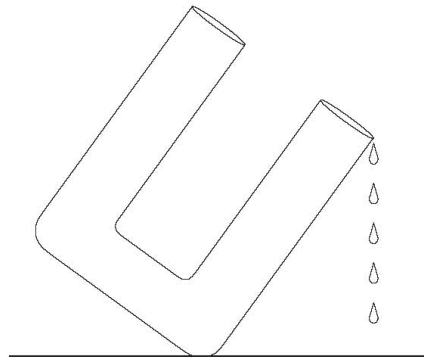
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TIMSS2007**Science****Eighth Grade**

An open U-shaped tube is filled with water as shown.



The tube is tipped so that the water just begins to drip out of one side. Show on the diagram below where the surface of the water is now.



S022292

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Content Domain

Physics

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide



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Note: A correct response must show the water surface in BOTH arms at an approximately horizontal angle ($\pm 10^\circ$). A template is provided on the following page to aid in determining whether responses are outside the allowable water level range for a correct response (Figure 1). Due to the possibility of acceptable angular errors ($\pm 10^\circ$) in the right arm, the vertical tolerance level for the left arm is greater. Specific incorrect diagnostic codes are included for errors in either the level of water (Code 70) or the angle of the water surface (Codes 71 and 72). See illustrations of example codes on the following page.

Code	Response	Item: S022292
	Correct Response	
10	Approximately horizontal surface shown in both arms within allowable limits (Figure 1).	
	Incorrect Response	
70	Approximately horizontal surface of water, but with an error such as higher/lower level(s) than allowable range or water level shown in only one arm (Figure 2).	
71	Water surface approximately parallel to the bottom of the U-tube shown in one or both arms (Figure 3). Exact level not important.	
72	Water surface is inclined in the opposite direction to that in Code 71 and $>10^\circ$ off horizontal (Figure 4).	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Figure 1 (Code 10)

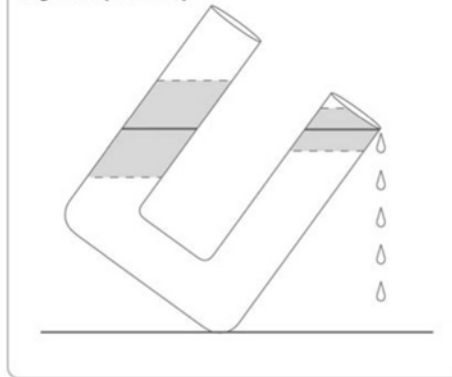


Figure 2 (Code 70)

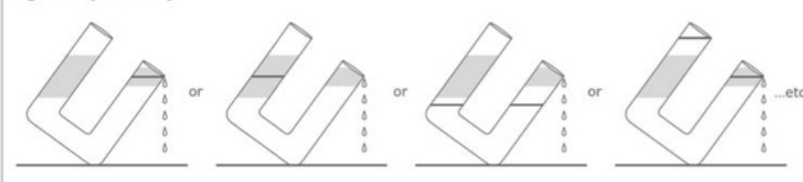
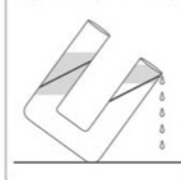


Figure 3 (Code 71)



Figure 4 (Code 72)



TIMSS2007**Science****Eighth Grade****Content Domain**

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

D

Colored alcohol is used in some glass thermometers. When placed in air of different temperatures, the column of alcohol rises or falls in the glass thermometer. Which of the following best explains why the height of the alcohol column changes?

- (A) The glass contracts when heated.
- (B) The alcohol contracts when heated.
- (C) The glass expands more than the alcohol when heated.
- (D) The alcohol expands more than the glass when heated.

S022054

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TIMSS2007

Science

Eighth Grade

Content Domain
Chemistry
Cognitive Domain
Knowing
Maximum Points
1
Key
B

- S022181
- Sugar is made up of many molecules. When sugar is dissolved in water, what happens to these molecules?
- (A) They no longer exist.
 - (B) They exist in solution.
 - (C) They evaporate.
 - (D) They combine with water to form new elements.

TIMSS2007**Science****Eighth Grade**

Which is NOT an example of a chemical change?

- Ⓐ Melting ice
- Ⓑ Corroding silver
- Ⓒ Burning match
- Ⓓ Rotting vegetation

S022208

Content Domain

Chemistry

Cognitive Domain

Knowing

Maximum Points

1

Key

A

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It takes 8 minutes for light from the Sun to reach Earth but it only takes 1.5 seconds for light, travelling at the same speed, to reach Earth from the Moon. Why is this?

S022078

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TIMSS2007**Science****Eighth Grade****Content Domain**

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide



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Note: A correct response is based on the relative distances of the Sun and Moon from the Earth. An implicit comparison is accepted for Code 10 as long as it is clear from the student response that a greater distance from the Sun is implied. Actual distances may be used to convey relative distance. The actual distances do not have to be completely accurate as long as they convey the correct relative distance. Responses that mention ONLY the great distance of the Sun OR the close distance of the Moon without comparative language are also scored as correct.

Code	Response	Item: S022078
	Correct Response	
10	Refers to the greater distance of the Sun and/or the shorter distance of the Moon (from Earth), implicitly or explicitly. <i>Examples:</i> <i>The Moon is closer to the Earth than the Sun.</i> <i>The Moon is 400 000 kilometers away and the Sun is 150 million kilometers away.</i> <i>The light takes longer from the Sun because it is so far from Earth.</i> <i>The Moon is very close to Earth</i>	
19	Other correct	
	Incorrect Response	
70	Refers to distance, but explanation does not clearly communicate the effect of either the Sun's or the Moon's distance on the time for light to travel to Earth. <i>Examples:</i> <i>The distance is so long.</i> <i>Because of the distance between them.</i>	
71	Refers only to an effect related to the nature/speed of light (from the Sun), reflection of light off the moon, or absorption of light by the atmosphere (ozone layer). <i>Examples:</i> <i>Because the Moon is closer to the Sun, and the Moon reflects light onto Earth.</i> <i>Because light travels faster.</i> <i>It is the same light from the Sun but has to reach the Moon first.</i> <i>The Sun has UV rays. The Earth has oz one to protect us from these rays.</i> <i>The Moon does not have an ozone layer.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

What is the main function of chlorophyll in plants?

- Ⓐ To absorb light energy
- Ⓑ To break down carbon dioxide
- Ⓒ To make plants' leaves poisonous to insects
- Ⓓ To protect plants from disease

S022126

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

A

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TIMSS2007**Science****Eighth Grade****Content Domain**

Physics

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

A tray containing 300 grams of water is placed in the freezer to make ice.

What is the mass of the ice after the water freezes?

(Check one box.)

- ☐ More than 300 grams
- ☐ 300 grams
- ☐ Less than 300 grams

Explain your answer.

S022281

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Note: A correct response is based on the mass of water remaining unchanged as a result of freezing (conservation of mass during a change of state). Responses may also address the possibility of evaporation or trapping of air during freezing. A correct code may, therefore, be given for 300 grams, less than 300 grams, or more than 300 grams provided the explanation given makes it clear that the student understands that the mass does not change as a result of the change of state. Explanations that include true statements about density differences but are not applicable to the problem are scored as incorrect (Code 70 or 71).

Code	Response	Item: S022281
	Correct Response	
10	300g. With a good explanation. <i>Examples:</i> 300g. The water changes into the same amount of ice. The same. The water only freezes. The same mass. Nothing disappears. Same. Just because the water is frozen does not mean the water multiplies or gets fewer grams. Same. When water freezes it stays the same weight. Same. Mass is constant through a physical change. The only difference is the density.	
11	Less than 300g. With a good explanation based on some of the water evaporating. <i>Examples:</i> The weight of ice will not change, but a little bit might evaporate. The weight of the ice would be slightly less since some of it will evaporate.	
12	More than 300g. With a good explanation based on the additional mass of trapped air. <i>Examples:</i> More. Water is dead weight, so it has no air pockets. The ice expands so air sneaks in and air has mass. More. Air is being placed when water freezes and traps the air in.	
19	Other correct	
	Incorrect Response	
70	Less than 300g. With no explanation or an incorrect explanation. <i>Examples:</i> Less. Ice has less density, so it weighs less. Less. When water freezes it expands and has a lower density. Less. When water freezes it loses weight.	
71	More than 300g. With no explanation or an incorrect explanation. <i>Examples:</i> More. Ice expands and takes up more space. More. The density goes up when it freezes. More. Ice is heavier than water; a solid is heavier than a liquid.	
72	300g. With no explanation or an incorrect explanation.	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Eighth Grade

S032385

Which characteristic is found ONLY in mammals?

- (A) eyes that detect color
- (B) glands that make milk
- (C) skin that absorbs oxygen
- (D) bodies that are protected by scales

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007**Science****Eighth Grade**

Which of the following is the best way to determine whether two people are related?

- Ⓐ Compare their blood types.
- Ⓑ Compare their handwriting.
- Ⓒ Compare their genes.
- Ⓓ Compare their fingerprints.

S032035

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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S032519

On a river near a town the government decided to build a dam for electricity and irrigation purposes. Write down one effect the dam could have on wildlife (animals or plants).

TIMSS2007

Science Eighth Grade

Content Domain
Earth Science

Cognitive Domain
Knowing

Maximum Points
1

Key
See scoring guide

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Note: A correct response must include a specific effect on wildlife (positive or negative) due to the dam. Vague or general responses that state only that plants/animals will die (or similar) with no specific effect given are scored as incorrect (Code 70). Mentioning only irrigation for farms/crops for human benefit is also scored as incorrect (Code 79). If more than one effect is given, then the code corresponding to the first correct effect should be used even if other incorrect effects are given. Since only one effect is required, the incorrect portion is not considered unless it negates the correct portion of the response.

Code	Response	Item: S032519
	Correct Response	
10	<p>States a specific negative effect of the dam on wildlife (change in habitat, water supply, food supply, etc.).</p> <p><i>Examples:</i></p> <p><i>There will be nowhere for the animals to live.</i></p> <p><i>There may be a shortage of water below the dam for wildlife.</i></p> <p><i>It could destroy the homes of animals and they would become extinct.</i></p> <p><i>Animals that live in the water or need to drink there would not be able to.</i></p>	
11	<p>States a specific positive effect of the dam on wildlife (change in habitat, water supply, food supply, etc.).</p> <p><i>Examples:</i></p> <p><i>The dam can provide more water for the animals above the dam.</i></p> <p><i>Plants in the area would have a permanent source of water so they would not die out.</i></p> <p><i>The pool above the dam would create a place for fish to live.</i></p> <p>Note: Irrigation for human benefit given in the stem is not accepted as a correct positive effect; these responses should be given Code 79.</p>	
19	Other correct	
	Incorrect Response	
70	<p>States only that plants or animals will die or similar. [No specific effect given.]</p> <p><i>Examples:</i></p> <p><i>Plants and animals are going to be destroyed.</i></p> <p><i>The wildlife will die.</i></p>	
71	<p>States an incorrect effect that reflects a misconception about dams.</p> <p><i>Examples:</i></p> <p><i>Electricity will flow through the water and kill the fish in the river.</i></p> <p><i>The dam creates radioactivity that can kill the animals.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

The table shows different materials that have been sorted into two groups.

Group 1	Group 2
Air	Steel
Ice	Copper
Wood	Gold

Which of the following could be used to sort the materials into Group 1 and Group 2?

- (A) solubility in water
- (B) compressibility
- (C) physical state
- (D) electrical conductivity

S032683

Content Domain

Chemistry

Cognitive Domain

Applying

Maximum Points

1

Key

D

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TIMSS2007**Science****Eighth Grade****Content Domain**

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

C

The gall bladder stores bile, a fluid that aids in digestion of fat. Which of the following types of food should be avoided by a person whose gall bladder has been removed?

- Ⓐ fruits
- Ⓑ grains
- Ⓒ cheese
- Ⓓ vegetables

S032258

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S032120

There are many ways that science and technology are used to help the environment. For example, some newer plastics used to make garbage bags have been developed that break down more easily when buried in landfill.

Describe how science and technology can be used to help solve each of the following environmental problems.

A. Oil spills in the oceans:

B. Global warming due to increased levels of carbon dioxide in the atmosphere:

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TIMSS2007

Science Eighth Grade

Content Domain
Earth Science
Cognitive Domain
Applying
Maximum Points
1
Key
See scoring guide

Note: A correct response must clearly describe a device or process and be connected to the application of science or technology. Responses that merely state what needs to be done (e.g., locate the oil) are not adequate for a correct code and should be given Code 70. Commonsense, practical responses or those based on individual activities will not be given credit without a clear link to the application of science and technology. Although the stem does not specify whether the technology must be currently available, answers should be reasonable and realistic based on current technology.

Code	Response	Item: S032120A
	Correct Response	
10	Mentions a device/process that can be used to locate, contain, disperse, break down, or collect the oil spills, etc. <i>Examples:</i> <i>Mechanical barriers can be put up to contain the oil.</i> <i>Organisms have been created that can break down oil.</i> <i>Vacuum the oil up.</i> <i>Treat with special detergents.</i>	
11	Mentions a device/process for improving the technology of oil tankers (construction, navigation, communications, etc.) <i>Examples:</i> <i>Make oil tankers with double hulls.</i> <i>Tankers should have separate tanks for oil and ballast water.</i> <i>Develop new, stronger materials for ships that cannot be broken by rocks or icebergs.</i>	
19	Other correct	
	Incorrect Response	
70	Gives only a commonsense response that is too vague or does not specify the application of science or technology. <i>Examples:</i> <i>Be more careful. Don't run into rock.</i> <i>Put the oil on airplanes instead of ships.</i> <i>Fix the ships.</i> <i>Reduce the amount of oil that the tankers carry.</i> <i>Technology can be used to retrieve the oil as it floats in water.</i> <i>Remove the oil.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science Eighth Grade

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Note: A correct response must clearly describe a device or process and be connected to the application of science or technology. Responses that merely state what needs to be done (e.g., remove carbon dioxide) are not adequate for a correct code and should be given Code 70. Although the stem does not specify whether the technology must be currently available, answers should be reasonable and realistic based on current technology.

Code	Response	Item: S032120B
	Correct Response	
10	Describes an alternative energy source or mode of transportation (to reduce carbon dioxide emissions from the burning of fossil fuels). <i>Examples:</i> <i>Electric cars.</i> <i>Solar panels that provide heat.</i> <i>Nuclear power plants that make electricity.</i>	
11	Describes an improvement in automotive technology, factories, fuels, etc. (to reduce carbon dioxide emissions). <i>Examples:</i> <i>Make more fuel efficient engines.</i> <i>Put giant air filters on factories.</i>	
12	Mentions planting trees (or similar). [Demonstrates knowledge of the relationship between plants and carbon dioxide uptake from the atmosphere, but no specific application of science/technology is given.] <i>Examples:</i> <i>Plant more trees to avoid deforestation.</i>	
19	Other correct	
	Incorrect Response	
70	States only what needs to be done (e.g., reduce the amount of CO ₂) but does not give a specific device/process. <i>Examples:</i> <i>Find a way to not put so much carbon dioxide into the atmosphere.</i>	
71	Mentions only not using cars, gasoline, fuel, or similar. [Demonstrates knowledge of the connection between carbon dioxide in the atmosphere and the burning of fossil fuels, but no specific application of science/technology is given.] <i>Examples:</i> <i>Don't burn as much gasoline.</i> <i>Stop using cars.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

The heart, veins, arteries, and capillaries make up which organ system?

- Ⓐ reproductive
- Ⓑ muscular
- Ⓒ excretory
- Ⓓ circulatory

S032606

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

Name one structure found in plant cells that is **not** found in animal cells.

S032015

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Code	Response	Item: S032015
	Correct Response	
10	Chloroplasts (chlorophyll)	
11	Cell wall	
12	Large vacuole	
19	Other correct	
	Incorrect Response	
70	Names a structure found in animal cells (e.g. nucleus, cell membrane, cytoplasm, mitochondria, centriole, DNA).	
71	Names a difference between plants and animals that is NOT a cell structure. <i>Examples:</i> <i>Petals.</i> <i>Plants have stems and flowers, but animals do not.</i> <i>Plants can photosynthesize.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007

Science

Eighth Grade

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide

Food and oxygen are produced during photosynthesis in green plants.
Chlorophyll is one thing that is needed for photosynthesis.

Name two more factors that are needed for photosynthesis.

1.

2.

S032310

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Note: Each of the two responses is scored separately using the same codes. Each correct diagnostic code (10, 11, 12, 13) can be used only once. If two responses are essentially the same, the second response should be given a Code 79. For example, if the first response names “carbon dioxide”, and the second response names “air”, then the first response is given Code 11 and the second is given Code 79. If only one response is given, the second should be coded as 99.

Code	Response	Item: S032310A,B
Correct Response		
10	Sunlight (or light)	
11	Carbon dioxide	
12	Water	
13	Air [Accepted as correct as long as carbon dioxide has not already been named and oxygen is not explicitly indicated.]	
19	Other correct <i>Examples:</i> <i>Enzymes</i> <i>NADP</i>	
Incorrect Response		
70	Oxygen	
71	Sugar, glucose, starch, carbohydrate (or similar)	
72	Soil (or similar)	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task) <i>Examples:</i> <i>Heat</i> <i>Leaves</i>	
Nonresponse		
99	Blank	

TIMSS2007

Science

Eighth Grade

The table below lists some properties of three pure substances (X, Y and Z). One of these substances is iron, one is water, and one is oxygen.

Substance	Melting/Freezing Point (°C)	Boiling Point (°C)	Good Conductor of Electricity
X	-218	-183	no
Y	1 535	2 750	yes
Z	0	100	no

Identify what each substance is by writing *iron*, *water* or *oxygen* into the correct spaces below.

Substance X is: _____

Substance Y is: _____

Substance Z is: _____

Content Domain

Chemistry

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

S032680



Note: To receive full credit, all three substances must be identified correctly. Partial credit is given for responses that correctly identify at least one of the substances. Each substance should only be entered once. If a substance is entered more than once, none of the entries for this substance is counted as correct. For example, if the response is oxygen, iron, iron, then only oxygen is correct and Code 11 is given. If the response is oxygen, oxygen, oxygen or iron, water, water Code 79 is given.

Code	Response	Item: S032680
	Correct Response	
20	All 3 substances are identified correctly: X = oxygen; Y = iron; Z = water. Note: The use of the word “air” should not be substituted for “oxygen” for full credit. If “air” is listed, then Code 10 should be used.	
	Partial Response	
10	Two substances are identified correctly; one substance is missing or incorrectly specified. <i>Examples:</i> <i>Air, Iron, Water</i> <i>Oxygen, Iron, Liquid</i> <i>Oxygen, Blank, Water</i> <i>Blank, Iron, Water</i>	
11	Only oxygen is correct (X); iron and water are missing or reversed. <i>Examples:</i> <i>Oxygen (air), Water, Iron</i> <i>Oxygen (air), Blank, Blank</i> Note: The use of the word “air” may be substituted for “oxygen” for partial credit.	
12	Only iron is correct (Y); oxygen and water are missing or reversed. <i>Examples:</i> <i>Water, Iron, Oxygen (air)</i> <i>Blank, Iron, Blank</i>	
13	Only water is correct (Z); oxygen and iron are missing or reversed. <i>Examples:</i> <i>Iron, Oxygen (air), Water</i> <i>Blank, Blank, Water</i>	
19	Other partially correct (with at least one substance identified correctly)	
	Incorrect Response	
79	Incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

Which of the following is an example of an acidic solution?

- (A) bleach
- (B) vinegar
- (C) sugar water
- (D) salt water

S032672

TIMSS2007

Science
Eighth Grade

Content Domain

Chemistry

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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TIMSS2007

Science

Eighth Grade

Content Domain

Physics

Cognitive Domain

Applying

Maximum Points

1

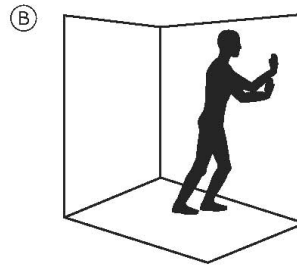
Key

C

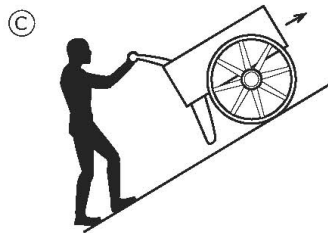
Work is done when an object is moved in the direction of an applied force. A person performed different tasks as shown in the diagrams below. In which diagram is the person doing work?



Holding a heavy object



Pushing against a wall



Pushing a cart up a ramp



Reading a book

S032392

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TIMSS2007**Science****Eighth Grade**

Which of the following properties of a substance is conserved during thermal expansion?

- Ⓐ mass
- Ⓑ volume
- Ⓒ shape
- Ⓓ distance between particles

S032425

Content Domain

Physics

Cognitive Domain

Knowing

Maximum Points

1

Key

A

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TIMSS2007

Science Eighth Grade

Content Domain

Physics

Cognitive Domain

Knowing

Maximum Points

1

Key

B

A sound is heard when you pluck a string on a guitar.
What will happen to the sound if the same string is plucked harder?

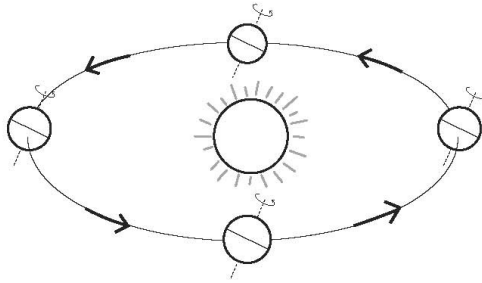
- (A) The volume will stay the same, and the pitch will be higher.
- (B) The pitch will stay the same, and the volume will be higher.
- (C) Both the pitch and the volume will be higher.
- (D) Both the pitch and the volume will stay the same.

S032257

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TIMSS2007**Science****Eighth Grade**

The diagram above shows the Earth's path around the Sun and the tilt of Earth's axis. Which of the following patterns on Earth is caused by the tilt of Earth's axis?

- (A) seasons
- (B) day and night
- (C) years
- (D) time zones

Content Domain

Earth Science

Cognitive Domain

Applying

Maximum Points

1

Key

A

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TIMSS2007

Science Eighth Grade

Where is most fresh (non-salty) water on Earth located?

- (A) oceans
- (B) rivers
- (C) lakes
- (D) polar ice caps

S032660

Content Domain

Earth Science

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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Science

Eighth Grade

A plot of land was divided into 10 equal areas. A different amount of fertilizer was added to each area. Rice was planted in each area. The table below shows the amount of fertilizer added and the yields of rice for each area.

	Area									
	1	2	3	4	5	6	7	8	9	10
Amount of fertilizer added (units of nitrogen per area)	0	30	50	60	70	80	100	120	140	160
Yield of rice (kg of rice per area)	7.1	8.3	14.2	25.4	26.2	26.2	26.2	26.1	17.6	14.4

Look at the data in the table. Provide an explanation for the effect of the amount of fertilizer on the yield of rice.

Content Domain

Earth Science

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

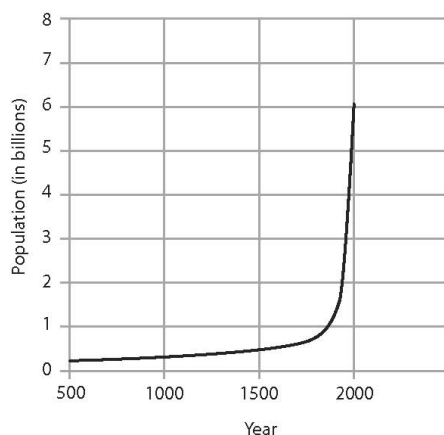
S032555

Note: Although the question asks for an ‘explanation’, credit will be given for responses that describe the effect of fertilizer on the yield of rice based on the data in the table.

Code	Response	Item: S032555
	Correct Response	
10	<p>Explanation refers explicitly to all three regions of the data table:</p> <p>i) Rice yield (growth) increases as fertilizer level is increased up to the optimum level (70).</p> <p>ii) Rice yield (growth) is greatest over an optimum fertilizer range (70-100).</p> <p>iii) Rice yield (growth) decreases as the fertilizer level is increased above the optimum level (100).</p> <p><i>Examples:</i></p> <p><i>The yield of rice increases for a while, but then it decreases. It should be between 70-100 units. There are not enough nutrients at the low levels and at high levels the fertilizer can kill the plants.</i></p> <p><i>Adding fertilizer will increase rice yields, but adding too much will decrease it. This proves that only a certain range of fertilizers will be best.</i></p> <p>Note: Responses may be quantitative or qualitative in nature. No credit is lost for incorrect or no units.</p>	
11	<p>Refers to an optimum level (range) of fertilizer but description of high or low fertilizer regions (i or iii) is incomplete or incorrect.</p> <p><i>Examples:</i></p> <p><i>Just the right amount of fertilizer must be added.</i></p> <p><i>The best level of fertilizer is between 70 and 100. Above that, the plants start dying.</i></p> <p><i>The rice yield increases up to a maximum level.</i></p>	
12	<p>Refers to lower rice yields at high and low fertilizer levels, but description of optimum region (ii) is incomplete or incorrect.</p> <p><i>Examples:</i></p> <p><i>Too much fertilizer produces less rice. Also too little fertilizer produces less rice.</i></p> <p><i>As you put more fertilizer on, more rice grows. If you put too much, though, the amount of rice will diminish.</i></p>	
19	Other correct	
	Incorrect Response	
70	<p>Mentions ONLY that the rice yield increases with increasing fertilizer level. [No description of regions ii and iii.]</p> <p><i>Examples:</i></p> <p><i>It increased as the fertilizer increased because plants need fertilizer to grow.</i></p>	
71	<p>Mentions ONLY that rice plants will die at high fertilizer level (or similar). [No description of regions i and ii.]</p> <p><i>Examples:</i></p> <p><i>If you put too much fertilizer on, the plant will die.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	Nonresponse	
99	Blank	

TIMSS2007**Science****Eighth Grade**

The graph shows the human population growth in the world over the past 1500 years.



State one reason why the human population increased rapidly between the years 1800 and 2000.

Content Domain

Biology

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Note: Credit is given for responses that are clearly related to increased survival or lifespan or decreased death rate due to improvements in health care, medicine, nutrition, sanitation, standard of living, etc. If a response mentions scientific advances, technology, or industrialization it must be clear how this is related to an increase in survival rate. If only technology (or similar) is mentioned, then Code 70 should be given. Responses that mention only increased birth rate or reproduction should receive Code 71.

Code	Response	Item: S032122
	Correct Response	
10	Gives a correct reason related to increased survival, lifespan, or decreased death rate (or similar). <i>Examples:</i> <i>Advances in medicine.</i> <i>Less deaths at birth.</i> <i>Better living conditions so people are living longer and healthier.</i> <i>Hospitals have better equipment.</i> <i>The sanitation is better.</i> <i>An increase in life span.</i> <i>More births than deaths due to higher standard of living.</i>	
19	Other correct	
	Incorrect Response	
70	Mentions technology, scientific advances or industrialization (or similar) but with NO connection to increased survival. <i>Examples:</i> <i>This is due to advanced technology.</i> <i>Because of the inventions that have been made.</i> <i>The industrial revolution.</i> <i>More factories.</i>	
71	Mentions only increased birth rate or reproduction. [No mention of decreased death rate or increased lifespan.] <i>Examples:</i> <i>Everyone is producing more humans every year.</i> <i>People get married earlier and start having babies.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



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