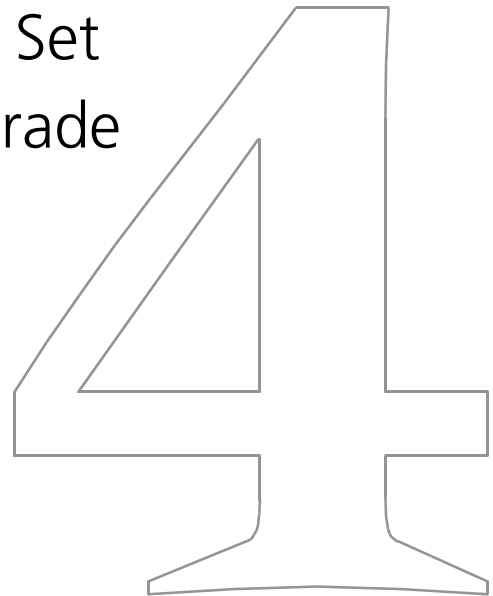


# TIMSS 2003

## SCIENCE ITEMS

Released Set  
Fourth Grade







**TIMSS & PIRLS**  
International Study Center  
Lynch School of Education, Boston College

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Unique ID	MS Block	MS Block Seq	Item Type	Key	Trend	Content Domain	Main Topic	Cognitive Domain
S011006	S01	01	MC	C	Yes	Physical Science	Classification and composition of matter	Conceptual Understanding
S011007	S01	02	MC	A	Yes	Earth Science	Earth's structure and physical features	Conceptual Understanding
S011008	S01	03	MC	D	Yes	Physical Science	Chemical change	Conceptual Understanding
S012033	S01	04	MC	A	Yes	Life Science	Structure, function and life processes in organisms	Factual Knowledge
S011001	S01	05	MC	B	Yes	Physical Science	Forces and motion	Conceptual Understanding
S011003	S01	06	MC	A	Yes	Earth Science	Earth's structure and physical features	Factual Knowledge
S011004	S01	07	MC	D	Yes	Life Science	Structure, function and life processes in organisms	Conceptual Understanding
S011005	S01	08	MC	D	Yes	Earth Science	Earth processes, cycles and history	Factual Knowledge
S011021	S01	09	MC	A	Yes	Life Science	Human health	Factual Knowledge
S011022	S01	10	MC	B	Yes	Earth Science	Earth in the solar system and universe	Factual Knowledge
S011023	S01	11	MC	D	Yes	Earth Science	Earth's structure and physical features	Reasoning and Analysis
S011030	S02	01	MC	C	Yes	Physical Science	Physical states and changes in matter	Conceptual Understanding
S011031	S02	02	MC	A	Yes	Life Science	Human health	Conceptual Understanding
S011032	S02	03	CR	X	Yes	Earth Science	Earth processes, cycles and history	Conceptual Understanding
S011033	S02	04	MC	A	Yes	Life Science	Reproduction and Heredity	Conceptual Understanding
S011025	S02	05	MC	C	Yes	Life Science	Structure, function and life processes in organisms	Factual Knowledge
S011026	S02	06	MC	D	Yes	Life Science	Structure, function and life processes in organisms	Conceptual Understanding
S011027	S02	07	MC	C	Yes	Earth Science	Earth in the solar system and universe	Conceptual Understanding
S011029	S02	09	MC	D	Yes	Physical Science	Light	Factual Knowledge
S011016	S02	10	MC	B	Yes	Life Science	Types, characteristics and classification of living things	Conceptual Understanding
S012007	S02	11	MC	C	Yes	Earth Science	Earth's structure and physical features	Conceptual Understanding
S011017	S03	01	MC	A	Yes	Physical Science	Physical states and changes in matter	Conceptual Understanding
S011018	S03	02	MC	D	Yes	Earth Science	Earth in the solar system and universe	Factual Knowledge
S012010	S03	03	MC	C	Yes	Life Science	Structure, function and life processes in organisms	Reasoning and Analysis
S011019	S03	04	CR	X	Yes	Life Science	Changes in environment	Reasoning and Analysis
S011009	S03	05	MC	D	Yes	Physical Science	Forces and motion	Reasoning and Analysis
S011010	S03	06	MC	D	Yes	Life Science	Ecosystems	Factual Knowledge
S011011	S03	07	MC	B	Yes	Physical Science	Energy types, sources and conversions	Conceptual Understanding
S011012	S03	08	MC	B	Yes	Earth Science	Earth's structure and physical features	Factual Knowledge
S011013	S03	09	MC	E	Yes	Earth Science	Earth's structure and physical features	Factual Knowledge
S011014	S03	10	MC	A	Yes	Physical Science	Heat and temperature	Conceptual Understanding
S011015	S03	11	MC	D	Yes	Life Science	Structure, function and life processes in organisms	Conceptual Understanding
S031017	S04	01	MC	D	No	Life Science	Development and life cycle of organisms	Factual Knowledge
S031246	S04	02	CR	X	No	Life Science	Structure, function and life processes in organisms	Conceptual Understanding
S031287	S04	03	MC	B	No	Life Science	Diversity, adaptation, and natural selection	Factual Knowledge
S031251	S04	04	CR	X	No	Life Science	Development and life cycle of organisms	Conceptual Understanding
S031053	S04	05	CR	X	No	Physical Science	Classification and composition of matter	Reasoning and Analysis
S031005	S04	06	CR	X	No	Physical Science	Properties and uses of water	Reasoning and Analysis
S031306	S04	07	MC	C	No	Physical Science	Electricity and magnetism	Conceptual Understanding
S031372A	S04	08	CR	X	No	Physical Science	Physical states and changes in matter	Reasoning and Analysis
S031372B	S04	08	CR	X	No	Physical Science	Physical states and changes in matter	Reasoning and Analysis
S031082	S04	09	MC	B	No	Earth Science	Earth's structure and physical features	Conceptual Understanding
S031349	S09	01	MC	A	No	Life Science	Types, characteristics and classification of living things	Factual Knowledge
S031330	S09	02	CR	X	No	Life Science	Human health	Conceptual Understanding
S031212	S09	03	MC	A	No	Life Science	Types, characteristics and classification of living things	Factual Knowledge
S031241D	S09	04	CR	X	No	Life Science	Structure, function and life processes in organisms	Conceptual Understanding
S031038	S09	05	MC	C	No	Physical Science	Electricity and magnetism	Conceptual Understanding

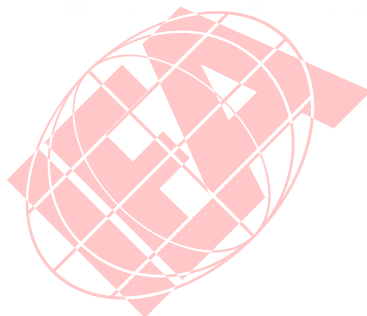
Unique ID	MS Block	MS Block Seq	Item Type	Key	Trend	Content Domain	Main Topic	Cognitive Domain
S031252	S09	06	CR	X	No	Life Science	Development and life cycle of organisms	Conceptual Understanding
S031406A	S09	07	CR	X	No	Physical Science	Classification and composition of matter	Factual Knowledge
S031406B	S09	07	CR	X	No	Physical Science	Classification and composition of matter	Conceptual Understanding
S031383	S09	08	MC	D	No	Earth Science	Earth processes, cycles and history	Reasoning and Analysis
S031379	S09	09	MC	B	No	Earth Science	Earth's structure and physical features	Reasoning and Analysis
S031060	S09	10	MC	C	No	Earth Science	Earth in the solar system and universe	Factual Knowledge
S031269	S10	01	MC	B	No	Life Science	Reproduction and heredity	Conceptual Understanding
S031284	S10	02	MC	D	No	Life Science	Diversity, adaptation, and natural selection	Reasoning and Analysis
S031338	S10	03	MC	C	No	Life Science	Ecosystems	Factual Knowledge
S031382	S10	04	CR	X	No	Earth Science	Earth processes, cycles and history	Conceptual Understanding
S031218	S10	05	CR	X	No	Life Science	Types, characteristics and classification of living things	Conceptual Understanding
S031326D	S10	06	CR	X	No	Life Science	Human health	Factual Knowledge
S031003	S10	07	MC	D	No	Life Science	Development and life cycle of organisms	Conceptual Understanding
S031035	S10	08	MC	D	No	Physical Science	Classification and composition of matter	Factual Knowledge
S031420	S10	09	MC	A	No	Physical Science	Chemical change	Conceptual Understanding
S031370	S10	10	CR	X	No	Physical Science	Physical states and changes in matter	Conceptual Understanding
S031313	S10	11	MC	B	No	Physical Science	Forces and motion	Factual Knowledge
S031409	S13	01	MC	D	No	Physical Science	Classification and composition of matter	Factual Knowledge
S031398	S13	02	MC	C	No	Earth Science	Use and conservation of natural resources	Factual Knowledge
S031072	S13	03	CR	X	No	Physical Science	Light	Conceptual Understanding
S031061	S13	04	MC	B	No	Physical Science	Chemical change	Conceptual Understanding
S031439A	S13	05	CR	X	No	Life Science	Ecosystems	Conceptual Understanding
S031439B	S13	05	CR	X	No	Life Science	Types, characteristics and classification of living things	Factual Knowledge
S031440	S13	06	CR	X	No	Earth Science	Earth in the solar system and universe	Reasoning and Analysis
S031441A	S13	07	CR	X	No	Life Science	Ecosystems	Reasoning and Analysis
S031441B	S13	07	CR	X	No	Life Science	Ecosystems	Reasoning and Analysis
S031442	S13	08	CR	X	No	Life Science	Structure, function and life processes in organisms	Reasoning and Analysis
S031443	S13	09	CR	X	No	Life Science	Development and life cycle of organisms	Conceptual Understanding

**TIMSS 2003**

A strong magnet will separate a mixture of

- (A) clear glass and green glass.
- (B) paper cups and plastic cups.
- (C) iron nails and aluminum nails.
- (D) sand and salt.

S011006



Content Domain

**Physical Science**

Main Topic

**Classification and composition of matter**

Cognitive Domain

**Conceptual Understanding**

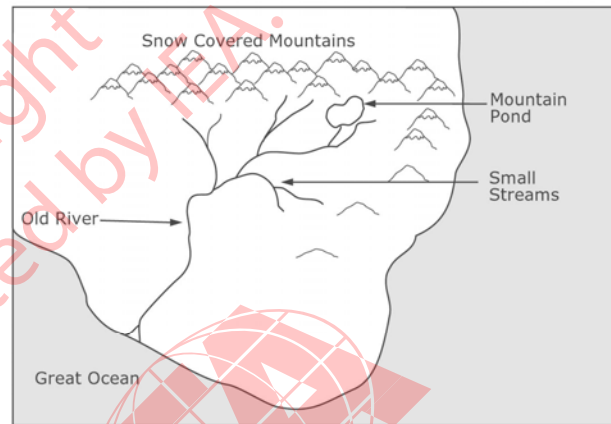
Key

**C**

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## TIMSS 2003

Look at this diagram.



The saltiest water is in the

- (A) Great Ocean
- (B) Mountain Pond
- (C) Old River
- (D) Small Streams

S011007

Content Domain

Earth Science

Main Topic

Earth's structure and physical features

Cognitive Domain

Conceptual Understanding

Key

A

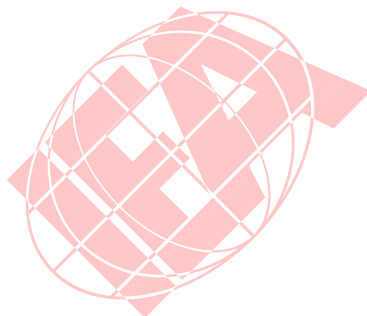
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**TIMSS 2003**

If you throw each one of these things away, which will decay fastest?

- (A) A glass bottle
- (B) A metal can
- (C) A plastic bottle
- (D) An apple core

S011008



Content Domain

**Physical Science**

Main Topic

**Chemical change**

Cognitive Domain

**Conceptual Understanding**

Key

**D**

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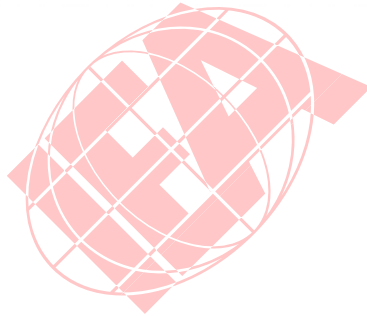


**TIMSS 2003**

Humans interpret seeing, hearing, tasting and smelling in the

- (A) brain
- (B) spinal cord
- (C) receptors
- (D) skin

S012033



Content Domain

Life Science

Main Topic

Structure, function and life processes in organisms

Cognitive Domain

Factual Knowledge

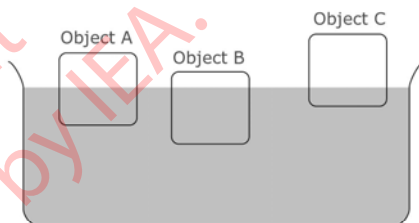
Key

A

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## TIMSS 2003

The picture shows three solid objects of the same size floating in water.



Which object weighs the most?

- (A) Object A
- (B) Object B
- (C) Object C
- (D) They all weigh the same.

Content Domain

Physical Science

Main Topic

Forces and motion

Cognitive Domain

Conceptual Understanding

Key

B

S011001

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**TIMSS 2003**

What covers most of the Earth's surface?

- (A) Water
- (B) Bare rock
- (C) Farm land
- (D) Cities and towns

S011003



Content Domain

**Earth Science**

Main Topic

**Earth's structure and physical features**

Cognitive Domain

**Factual Knowledge**

Key

**A**

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**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Structure, function and life processes in organisms**

Cognitive Domain

**Conceptual Understanding**

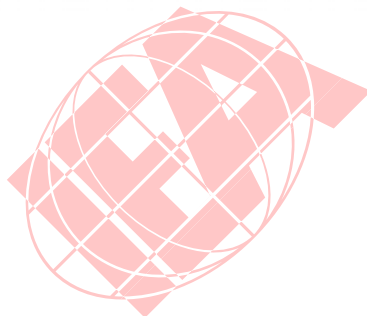
Key

**D**

If the body takes in more food than it uses,

- (A) breathing becomes faster.
- (B) weight is lost.
- (C) the heart rate increases.
- (D) the food is stored as fat.

S011004



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**TIMSS 2003**

The fossils of dinosaurs that lived millions of years ago can be found in

- (A) the water of oceans.
- (B) the ice on ponds.
- (C) the trunks of trees.
- (D) rocks in the ground.

S011005



Content Domain

Earth Science

Main Topic

Earth processes, cycles and history

Cognitive Domain

Factual Knowledge

Key

D

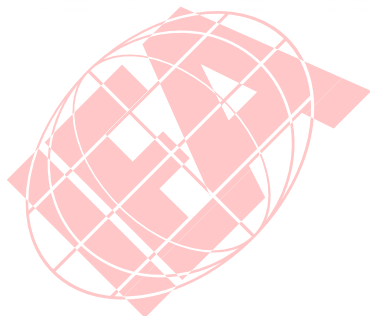
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## TIMSS 2003

Which plant is grown for food?

- (A) Rice
- (B) Tobacco
- (C) Orchid
- (D) Cotton

S011021



Content Domain

Life Science

Main Topic

Human health

Cognitive Domain

Factual Knowledge

Key

A

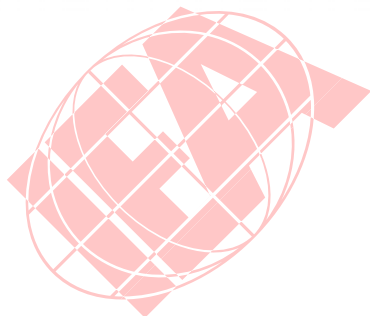
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**TIMSS 2003**

Each year the Earth moves once around

- (A) Mars
- (B) the Sun
- (C) the Moon
- (D) all of the other planets

S011022



Content Domain

**Earth Science**

Main Topic

**Earth in the solar system  
and universe**

Cognitive Domain

**Factual Knowledge**

Key

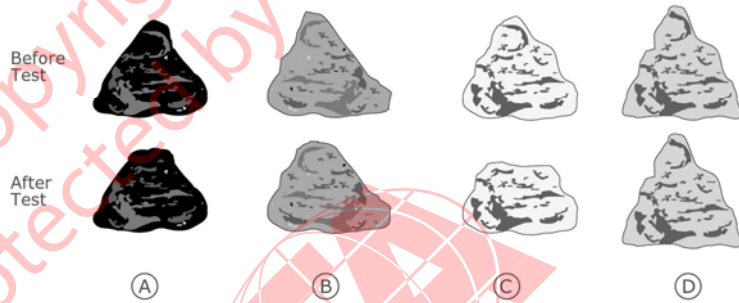
**B**

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**TIMSS 2003**

Terry tested four rocks to see how hard they are. He rubbed each of them against some hard steel for one minute. He drew pictures of what they looked like before he rubbed them and after he rubbed them.

Circle which of Terry's rocks is the hardest.



Content Domain

**Earth Science**

Main Topic

**Earth's structure and physical features**

Cognitive Domain

**Reasoning and Analysis**

Key

**D**

S011023

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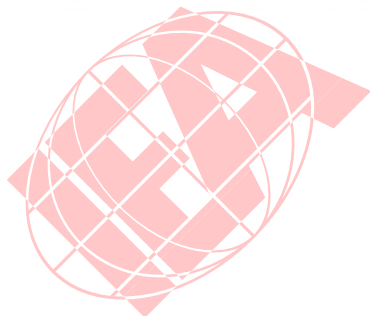


**TIMSS 2003**

What happens to water when it boils?

- (A) It changes color.
- (B) It becomes heavier.
- (C) It changes into water vapor.
- (D) It stops bubbling.

S011030



Content Domain

**Physical Science**

Main Topic

**Physical states and changes in matter**

Cognitive Domain

**Conceptual Understanding**

Key

**C**

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**TIMSS 2003**

How can washing your hands help keep you from getting sick?

- (A) It washes away germs.
- (B) It makes your hands look nice.
- (C) It keeps your skin from drying out.
- (D) It makes your hands warmer.

Content Domain

Life Science

Main Topic

Human health

Cognitive Domain

Conceptual Understanding

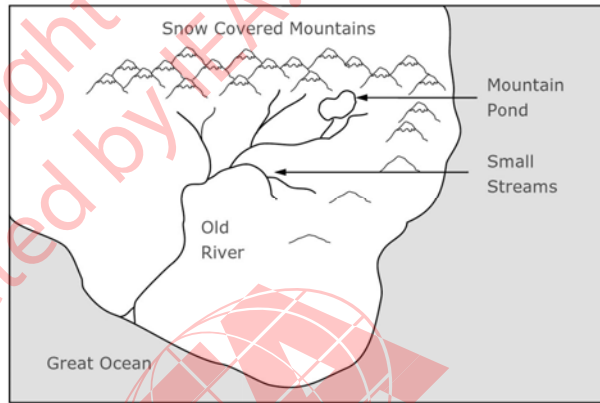
Key

A

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# TIMSS 2003

Draw an arrow on the Old River to show the direction that the water flows.



S011032

Content Domain

**Earth Science**

Main Topic

**Earth processes, cycles and history**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

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**Note:** To receive credit, responses must indicate that the flow is "To the Great Ocean". The response may be in words rather than on the diagram OR the arrowhead may be parallel to the flow but further away from the river. For example, arrowhead anywhere up by the feeder rivers and streams even if direction is correct. Code 19 should be used for these other types of correct responses.

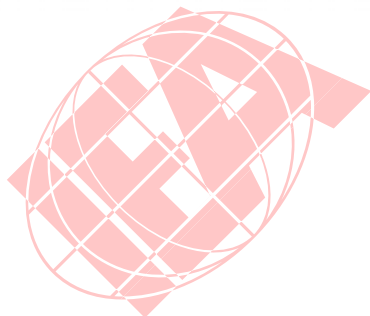
Code	Response	Item: S011032
	<b>Correct Response</b>	
10	Draws an arrow on the diagram that is on river or along the river below the feeder rivers and streams with an arrowhead pointing towards the Great Ocean.	
19	Other correct	
	<b>Incorrect Response</b>	
70	Draws an arrow pointing the opposite way or a prose description of this direction.	
71	Draws an arrow that points in any other direction.	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

## TIMSS 2003

What will most likely affect your adult height?

- (A) The height of your parents
- (B) The height of your brothers and sisters
- (C) Your hair color
- (D) Your weight

S011033



Content Domain

Life Science

Main Topic

Reproduction and Heredity

Cognitive Domain

Conceptual Understanding

Key

A

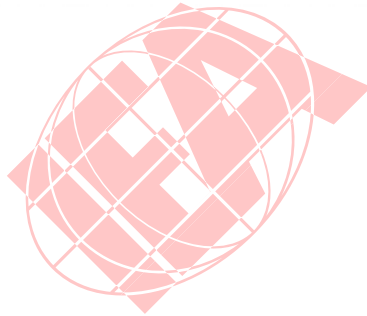
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**TIMSS 2003**

Where does air go when a person breathes in?

- (A) Into the heart
- (B) Into the stomach
- (C) Into the lungs
- (D) Into the liver

S011025



Content Domain

Life Science

Main Topic

Structure, function and life processes in organisms

Cognitive Domain

Factual Knowledge

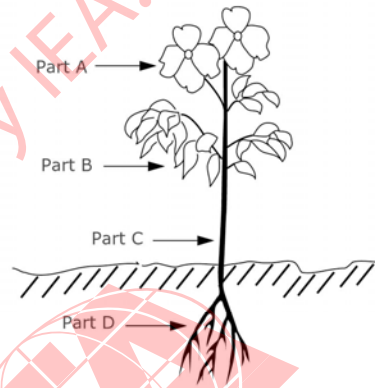
Key

C

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## TIMSS 2003

Which part of the plant takes in the MOST water?



- (A) Part A
- (B) Part B
- (C) Part C
- (D) Part D

S011026

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Content Domain

Life Science

Main Topic

Structure, function and life processes in organisms

Cognitive Domain

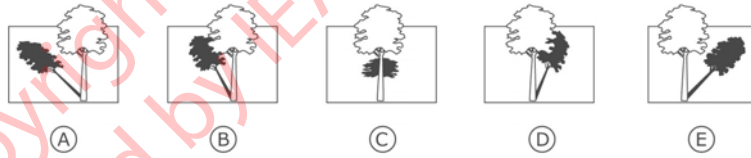
Conceptual Understanding

Key

D

**TIMSS 2003**

At different times during a sunny day a tree was seen to cast a shadow of different length as shown in the diagrams below. Which diagram shows the shadow at mid-day (12 noon)?



Content Domain

**Earth Science**

Main Topic

**Earth in the solar system and universe**

Cognitive Domain

**Conceptual Understanding**

Key

**C**

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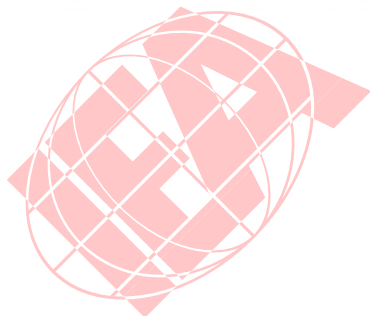


**TIMSS 2003**

Which pair together could cause a rainbow?

- (A) Fog and clouds
- (B) Rain and snow
- (C) Clouds and ice
- (D) Sunshine and rain

S011029



Content Domain

**Physical Science**

Main Topic

**Light**

Cognitive Domain

**Factual Knowledge**

Key

**D**

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**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Types, characteristics and classification of living things**

Cognitive Domain

**Conceptual Understanding**

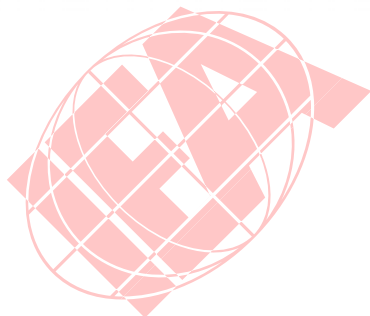
Key

**B**

Which one of these animals does NOT lay eggs?

- (A) chickens
- (B) dogs
- (C) frogs
- (D) turtles

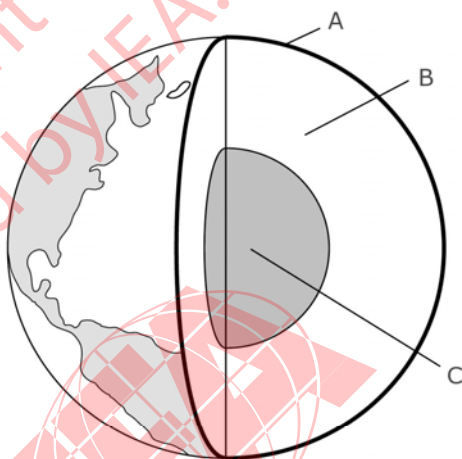
S011016



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## TIMSS 2003

The picture shows the three main layers of the Earth.



Where is it the hottest?

- (A) Layer A
- (B) Layer B
- (C) Layer C
- (D) All three layers are the same temperature.

S012007

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Content Domain

Earth Science

Main Topic

Earth's structure and physical features

Cognitive Domain

Conceptual Understanding

Key

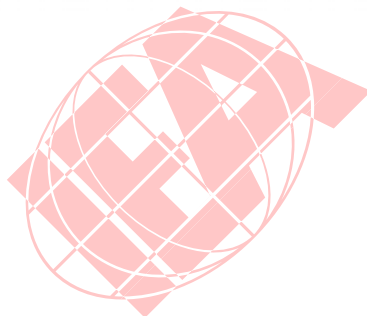
C

## TIMSS 2003

When you make soap bubbles, what is inside the bubbles?

- (A) Air
- (B) Soap
- (C) Water
- (D) Nothing

S011017



Content Domain

Physical Science

Main Topic

Physical states and changes  
in matter

Cognitive Domain

Conceptual Understanding

Key

A

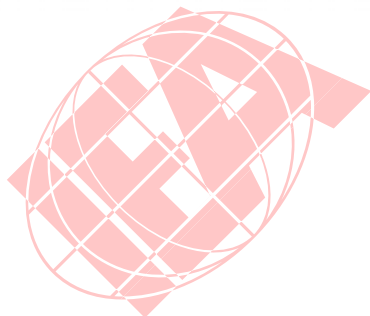
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**TIMSS 2003**

Which of these is hottest?

- (A) The Earth
- (B) Mars
- (C) The Moon
- (D) The Sun

S011018



Content Domain

Earth Science

Main Topic

Earth in the solar system  
and universe

Cognitive Domain

Factual Knowledge

Key

D

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## TIMSS 2003

Immediately before and after running a 50 metre race, your pulse and breathing rates are taken. What changes would you expect to find?

- (A) no change in pulse but a decrease in breathing rate
- (B) an increase in pulse but no change in breathing rate
- (C) an increase in pulse and breathing rate
- (D) a decrease in pulse and breathing rate
- (E) no change in either

Content Domain

Life Science

Main Topic

Structure, function and life processes in organisms

Cognitive Domain

Reasoning and Analysis

Key

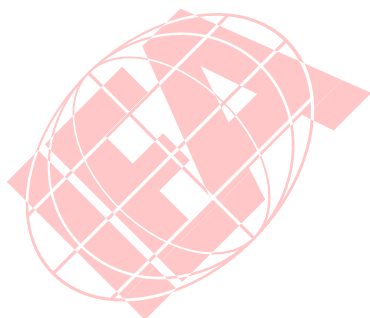
C

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**TIMSS 2003**

Write down what happens to plants and fish in a river when a factory pours large amounts of hot water into the river.

S011019



Content Domain

**Life Science**

Main Topic

**Changes in environment**

Cognitive Domain

**Reasoning and Analysis**

Key

**See scoring guide**

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Code	Response	Item: S011019
	<b>Correct Response</b>	
10	Explains that some species will die; others will be more abundant. <i>Examples: Fish die, plants grow more because there is more water.</i>	
11	Explains that many plants and fishes die. <i>Examples: They die.</i> <i>They are almost cooked.</i>	
12	Explains that fish try to leave. <i>Examples: The fish swim away.</i>	
19	Other correct <i>Examples: Fish die, plants live.</i>	
	<b>Incorrect Response</b>	
70	The description or explanation given is not adequate. <i>Examples: They cannot breathe.</i> <i>They can do better and do worse.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off tasks)	
	<b>Nonresponse</b>	
99	Blank	



## TIMSS 2003

Content Domain

Physical Science

Main Topic

Forces and motion

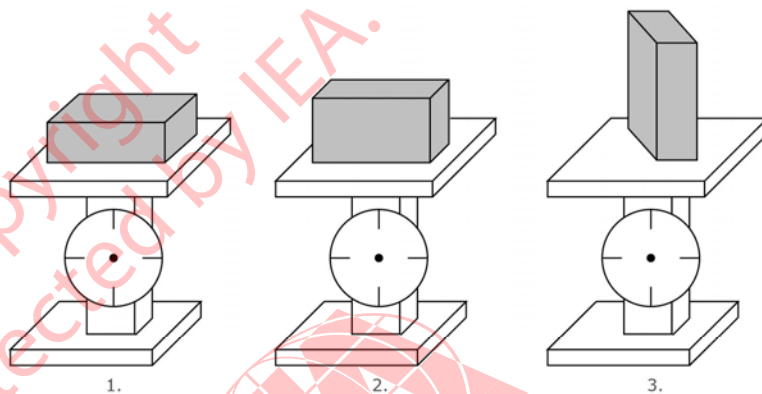
Cognitive Domain

Reasoning and Analysis

Key

D

The same brick is put on a scale in three different ways.



What will the scale show?

- (A) 1 will show the greatest weight.
- (B) 2 will show the greatest weight.
- (C) 3 will show the greatest weight.
- (D) All will show the same weight.

S011009

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**TIMSS 2003**

Which animal eats only plants?

- (A) Cat
- (B) Dog
- (C) Lion
- (D) Rabbit

Content Domain

Life Science

Main Topic

Ecosystems

Cognitive Domain

Factual Knowledge

Key

D

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**TIMSS 2003**

A renewable energy source is a source that will not run out. Which is an example of the use of such a source?

- (A) A coal furnace heating a house
- (B) A windmill pumping water on a farm
- (C) A kerosene lamp lighting a room
- (D) A diesel truck traveling along a road

Content Domain

**Physical Science**

Main Topic

**Energy types, sources and conversions**

Cognitive Domain

**Conceptual Understanding**

Key

**B**

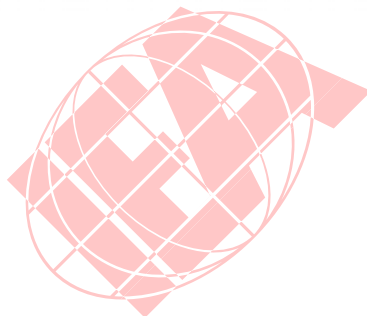
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**TIMSS 2003**

What gas in the air do we need to breathe in order to live?

- (A) nitrogen
- (B) oxygen
- (C) carbon dioxide
- (D) hydrogen
- (E) water vapor

S011012



Content Domain

**Earth Science**

Main Topic

**Earth's structure and physical features**

Cognitive Domain

**Factual Knowledge**

Key

**B**

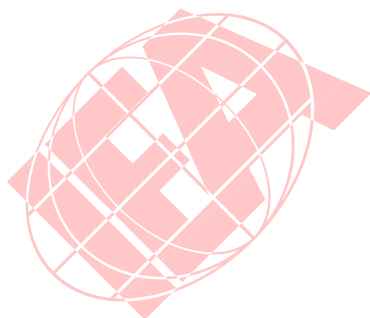
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**TIMSS 2003**

Large amounts of metals like iron and aluminum are found in

- (A) dead trees
- (B) water
- (C) animal bones
- (D) oil wells
- (E) rocks

S011013



Content Domain

**Earth Science**

Main Topic

**Earth's structure and physical features**

Cognitive Domain

**Factual Knowledge**

Key

**E**

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## TIMSS 2003

Content Domain

Physical Science

Main Topic

Heat and temperature

Cognitive Domain

Conceptual Understanding

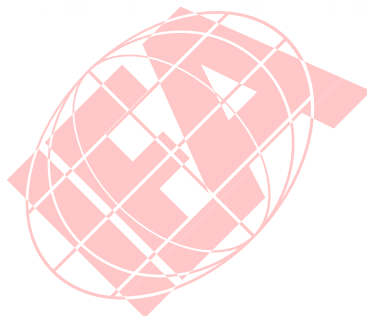
Key

A

Yumiko gave some reasons why kettles and kitchen pans are often made of copper. Which reason is correct?

- (A) Copper is a good conductor of heat.
- (B) Copper is easy to melt.
- (C) Copper is difficult to shape.
- (D) Copper dissolves in hot water.

S011014



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**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

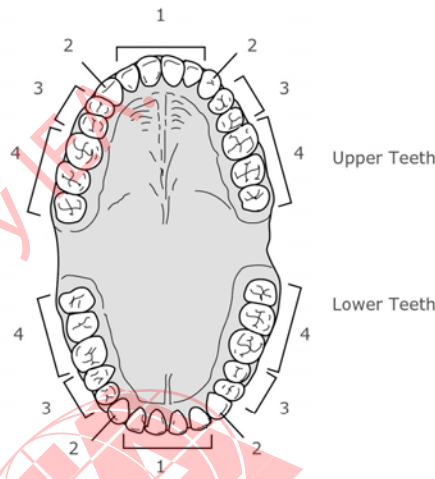
**Structure, function and life processes in organisms**

Cognitive Domain

**Conceptual Understanding**

Key

**D**



The teeth that people use for grinding their food are labeled in the picture as

- (A) 1 only
- (B) 3 only
- (C) 1 and 2
- (D) 3 and 4

S011015

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**TIMSS 2003**

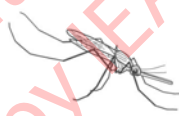
Which of these insects is correctly paired with its young form?

Housefly



(A)

Mosquito



(B)

Grasshopper



(C)

Butterfly



(D)

S031017

Content Domain

Life Science

Main Topic

Development and life cycle of organisms

Cognitive Domain

Factual Knowledge

Key

D

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**TIMSS 2003**

Beth is playing soccer. She gets very hot. Name one thing her body does to cool down.

Content Domain

**Life Science**

Main Topic

**Structure, function and life processes in organisms**

Cognitive Domain

**Conceptual Understanding**

Key

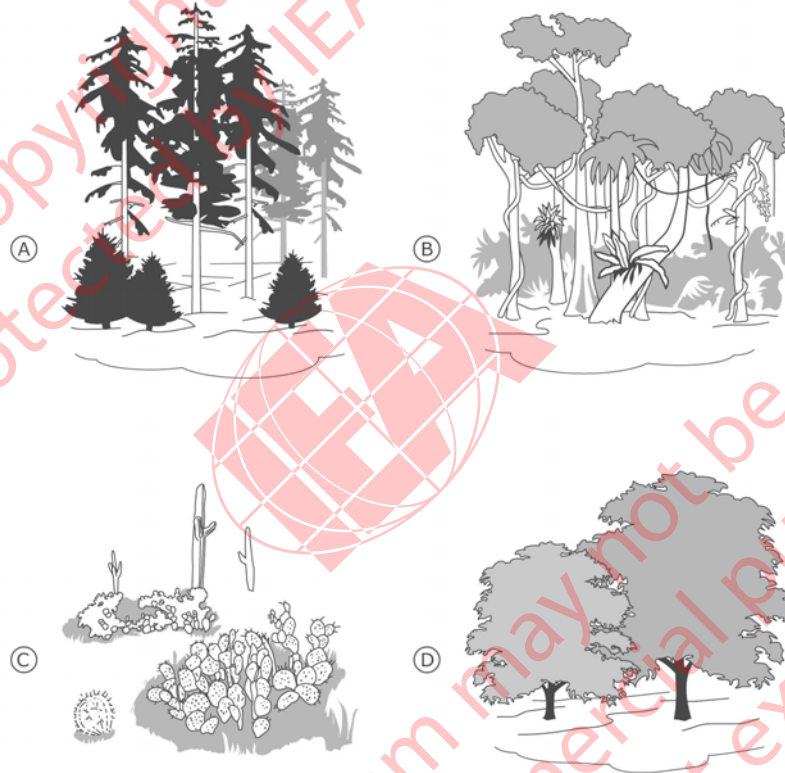
**See scoring guide**

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Code	Response	Item: S031246
	<b>Correct Response</b>	
10	States that the body releases sweat or equivalent. <i>Examples: Her body sweats to cool down.</i> <i>She sweats.</i> <i>Sweat.</i> <i>It gives off sweat.</i> <i>Perspire</i>	
19	Other correct <i>Examples: Blood vessels dilate.</i>	
	<b>Incorrect Response</b>	
70	Refers only to voluntary or external activities. <i>Examples: She could jump into a lake.</i> <i>Beth could fan her hand in front of her face.</i> <i>Drink water.</i> <i>She needs to rest.</i> <i>Take a shower.</i> <i>She could take her jacket off.</i> <i>Do a cool down exercise.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples: Her heart beats faster.</i>	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Which of these types of plants are usually found growing in a tropical rain forest?



Content Domain

**Life Science**

Main Topic

**Diversity, adaptation, and natural selection**

Cognitive Domain

**Factual Knowledge**

Key

**B**

S031287

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**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Development and life cycle of organisms**

Cognitive Domain

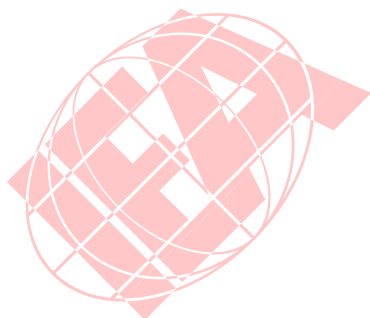
**Conceptual Understanding**

Key

**See scoring guide**

Children grow taller and become heavier as they develop into adults.  
Describe one other physical change that takes place in children's bodies as they become adults.

S031251



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**Note:** To receive credit, responses must refer to a physical or developmental change occurring between childhood/adolescence and adulthood. Changes that occur after adulthood are scored as incorrect (Code 72).

Code	Response	Item: S031251
	<b>Correct Response</b>	
10	<p>Describes a correct developmental change.</p> <p><i>Examples: Boys start growing beards.</i></p> <p><i>They start growing hair on their bodies.</i></p> <p><i>Girls start menstruating.</i></p> <p><i>They start developing their sex organs.</i></p> <p><i>Boys voices break and deepen.</i></p> <p><i>Girls hips will widen.</i></p> <p><i>Women get breasts.</i></p> <p><i>They can start having babies.</i></p>	
11	<p>Describes a more general physical change.</p> <p><i>Examples: They develop muscles and get stronger.</i></p> <p><i>They lose their little teeth and get new bigger teeth.</i></p>	
19	Other correct	
	<b>Incorrect Response</b>	
70	<p>Mentions only that they get smarter or learn more.</p> <p><i>Examples: They get smarter and smarter.</i></p> <p><i>They learn to read.</i></p>	
71	<p>Mentions <b>only</b> that they grow, get bigger, older, or similar.</p> <p><i>Examples: They grow up.</i></p> <p><i>Their feet get bigger.</i></p>	
72	<p>Mentions changes that occur after adulthood.</p> <p><i>Examples: They get gray hair.</i></p> <p><i>They stop growing taller.</i></p> <p><i>They go bald and get wrinkled.</i></p>	
79	<p>Other incorrect (including crossed out/erased, stray marks, illegible or off task).</p> <p><i>Examples: They look different.</i></p> <p><i>Their personality and attitude changes.</i></p> <p><i>Puberty.</i></p> <p><i>They mature.</i></p>	
	<b>Nonresponse</b>	
99	Blank	

## TIMSS 2003

Content Domain

Physical Science

Main Topic

Classification and  
composition of matter

Cognitive Domain

Reasoning and Analysis

Key

See scoring guide

The properties of three materials are compared in the table below.  
One of the materials is wood, one is rock and one is iron.

Property	Material 1	Material 2	Material 3
Sinks in water?	Yes	No	Yes
Burns easily?	No	Yes	No
Attracted by a magnet?	Yes	No	No

Identify the three materials by filling in the spaces below.

Wood is material number: \_\_\_\_\_

Rock is material number: \_\_\_\_\_

Iron is material number: \_\_\_\_\_

S031053

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**Note:** To receive full credit, all three materials must be identified correctly. Partial credit is given if one or two of the substances are identified correctly. If two substances are identified with the same number, neither one can be considered as correct. For example, a response of 2, 1, 1 should be given a Code 11. A response of 2, 2, 2 should be given a Code 79.

Code	Response	Item: S031053
	<b>Correct Response</b>	
20	All three materials identified correctly: wood = 2; rock = 3; iron = 1	
	<b>Partial Response</b>	
10	Two materials identified correctly (1 left blank)	
11	Only <b>wood</b> identified correctly (2); rock and iron are blank or reversed	
12	Only <b>rock</b> identified correctly (3); wood and iron are blank or reversed	
13	Only <b>iron</b> identified correctly (1); wood and rock are blank or reversed	
19	Other partially correct (with at least one material correct)	
	<b>Incorrect Response</b>	
79	Incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Content Domain

**Physical Science**

Main Topic

**Properties and uses of water**

Cognitive Domain

**Reasoning and Analysis**

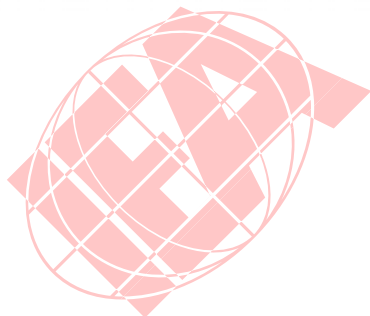
Key

**See scoring guide**

A closed glass bottle filled with water was left in the freezer overnight.  
In the morning the glass was found broken.

Why did freezing the water cause the bottle to break?

S031005

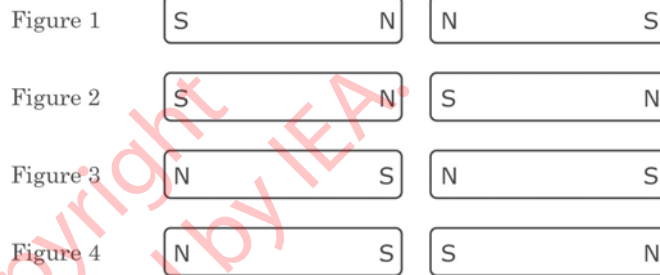


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Code	Response	Item: S031005
	<b>Correct Response</b>	
10	Refers to water expanding or increasing in volume (explicitly or implicitly). <i>Examples: Water expanded.</i> <i>Its volume increased.</i> <i>There was not enough room in the bottle for the water to freeze.</i> <i>The water got bigger when it froze.</i> <i>When water freezes it expands.</i>	
19	Other correct	
	<b>Incorrect Response</b>	
70	Refers ONLY to water freezing or turning into ice (or similar). [No mention of water expansion.] <i>Examples: It turned into ice and broke.</i> <i>It turned into solid.</i> <i>Because of the ice.</i> <i>The freezer was too cold and it froze the water so hard it broke the glass.</i>	
71	Refers ONLY to pressure or force of ice (or similar). [No mention of water expansion.] <i>Examples: The pressure on the inside.</i> <i>The force of water and cold air broke the glass.</i> <i>Because of the pressure from the ice.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples: The glass froze and turned to ice.</i> <i>It got too cold.</i>	
	<b>Nonresponse</b>	
99	Blank	

## TIMSS 2003



Which of the figures above shows a situation where two magnets repel each other?

- (A) Figures 1 and 3  
(B) Figures 2 and 3  
(C) Figures 1 and 4  
(D) Figures 1, 2, 3, and 4

S031306

Content Domain

Physical Science

Main Topic

Electricity and magnetism

Cognitive Domain

Conceptual Understanding

Key

C

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## TIMSS 2003

Content Domain

Physical Science

Main Topic

Physical states and changes  
in matter

Cognitive Domain

Reasoning and Analysis

Key

See scoring guide

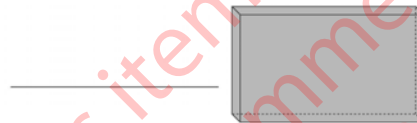
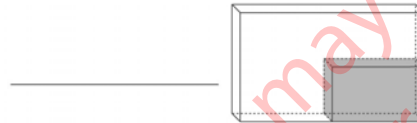
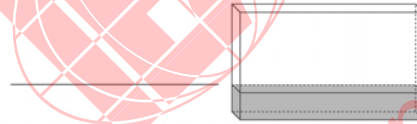


The figure **above** shows a box that contains a material that could be a solid, a liquid or a gas. The material is then put into a box four times as large.



Look at the figures **below**. They show how the different types of material will look when put into the larger box.

A. Identify which figure shows a solid, which shows a liquid and which shows a gas. (Write the word *solid*, *liquid* or *gas* on the line next to each figure below. Use each word only once.)



B. Explain your answers.

S031372

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**A: Codes for Identification**

**Note:** If any state (solid, liquid or gas) is listed more than once, then none of the duplicated responses will be considered as correct. For example, a response of “liquid, gas, gas” should receive a Code 70. A response of “liquid, liquid, liquid” should receive a Code 79.

Code	Response	Item: S031372A
	<b>Correct Response</b>	
10	Identifies all 3 correctly: <b>Liquid – Solid - Gas</b>	
	<b>Incorrect Response</b>	
70	Only <b>liquid</b> is correct.	
71	Only <b>solid</b> is correct.	
72	Only <b>gas</b> is correct.	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

## TIMSS 2003

Content Domain

Physical Science

Main Topic

Physical states and changes  
in matter

Cognitive Domain

Reasoning and Analysis

Key

See scoring guide

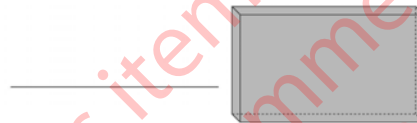
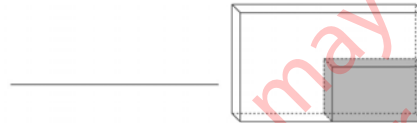
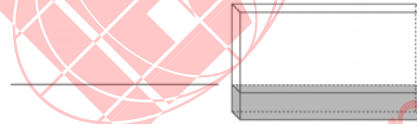


The figure **above** shows a box that contains a material that could be a solid, a liquid or a gas. The material is then put into a box four times as large.



Look at the figures **below**. They show how the different types of material will look when put into the larger box.

A. Identify which figure shows a solid, which shows a liquid and which shows a gas. (Write the word *solid*, *liquid* or *gas* on the line next to each figure below. Use each word only once.)



B. Explain your answers.

S031372

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**B: Codes for Explanation**

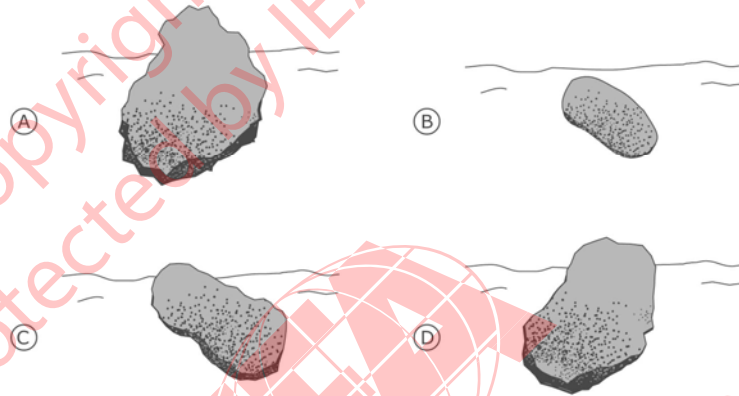
**Note:** Credit will be given for responses that refer to “liquid” as “water” or to “gas” as “air”.

Code	Response	Item: S031372B
	<b>Correct Response</b>	
20	<p>Explanation refers to at least one property of each of the three states that differentiates them:</p> <p>i) <b>Liquids:</b> flow (or take the shape of their container); cannot be compressed; have a definite or fixed volume; seek the lowest level (or similar).</p> <p>ii) <b>Solids:</b> keep a definite or fixed shape (volume); are hard (objects); cannot be compressed.</p> <p>iii) <b>Gases:</b> expand or can be compressed (to fill a container of different sizes/shapes); can spread out, can rise (or similar).</p> <p><i>Examples: Liquid can take any shape or form; solid can be hard; gas can take up a lot of room.</i>  <i>Liquid runs and finds the lowest level; solid keeps the same shape; gas takes up all the room.</i>  <i>Liquid would flow down and cover the bottom; solid is formed into a shape and leave some room on the bottom; gas would spread out.</i>  <i>Water cannot be compressed; solid is an object; air can be compressed.</i></p>	
29	Other fully correct	
	<b>Partial Response</b>	
10	<p>Explanation includes a property that correctly differentiates at least one of the states (solid, liquid or gas) but not all three.</p> <p><i>Examples: Solids remain the same, gases go everywhere.</i>  <i>Liquids run, gases evaporate; solids don't go anywhere.</i>  <i>The solid stays the same. The gas expands all the way.</i>  <i>Liquid and gas both follow the shape of the container; solids have a definite shape.</i></p>	
19	Other partially correct	
	<b>Incorrect Response</b>	
70	<p>Refers to observations, uses or examples of solids, liquids or gases, but inadequate for answering question.</p> <p><i>Examples: The liquid is water; the solid is a block of wood; the gas is oxygen.</i>  <i>Solids are heavier.</i>  <i>Blocks are made of solids.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Lily found four rocks of the same material in a riverbed. They had different shapes and sizes.

Which rock has most likely been carried the farthest down the river?



S031082

Content Domain

**Earth Science**

Main Topic

**Earth's structure and physical features**

Cognitive Domain

**Conceptual Understanding**

Key

**B**

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**TIMSS 2003**

Which of these are insects?



1



2



3



4

- (A) 1 and 3 only
- (B) 1 and 4 only
- (C) 2 and 4 only
- (D) 3 and 4 only

S031349

Content Domain

Life Science

Main Topic

Types, characteristics and classification of living things

Cognitive Domain

Factual Knowledge

Key

A

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**TIMSS 2003**

People need to protect themselves from getting too much sun. Name one thing that can happen to their bodies if they are not protected from the sun.

Content Domain

**Life Science**

Main Topic

**Human health**

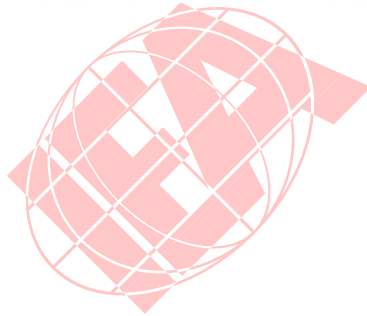
Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

S031330



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**Note:** To receive credit, responses must mention a specific effect. Priority should be given to Code 10. If a response mentions cancer, skin cancer, or similar, then Code 10 should be given even if other correct codes apply. Otherwise, the code corresponding to the first correct response should be given. General or vague responses that refer only to illness, etc., should be given Code 70.

Code	Response	Item: S031330
	<b>Correct Response</b>	
10	Mentions <b>skin cancer</b> or <b>cancer</b> . <i>Examples: They will get sunburn or sun cancer and might die.</i> <i>They might get skin cancer.</i> <i>Cancer.</i>	
11	Mentions sunburn, tanning, or similar. <i>Examples: They will get sunburn.</i> <i>Sunburn and heat rash.</i> <i>The sun could burn their skin and their skin would turn red.</i> <i>They can get a sun tan if they are not protected from the sun.</i> <i>Their skin can get burned from the sun.</i> <i>Their skin changes into a darker color when they lie in the sun for a long time.</i>	
12	Mentions a heat-related illness such as sun stroke, dehydration, heat rash, or similar. <i>Examples: People can get heat stroke from the hot sun.</i> <i>Heat rash.</i> <i>Stroke could happen.</i>	
19	Other correct <i>Examples: You could go blind if you looked directly into the sun.</i> <i>Sun allergy.</i>	
	<b>Incorrect Response</b>	
70	Mentions <b>only</b> the sun causing illness (or similar). [No specific effect identified.] <i>Examples: Getting too much sun makes you feel sick.</i> <i>It can make people ill.</i> <i>It's bad for the whole body.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Which group consists only of living things?

- (A) rabbit, seed, bird
- (B) seed, bird, wind
- (C) volcano, candle, rabbit
- (D) wind, candle, volcano

Content Domain

**Life Science**

Main Topic

**Types, characteristics and classification of living things**

Cognitive Domain

**Factual Knowledge**

Key

**A**

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**TIMSS 2003**

Write down two reasons why the human body needs to be covered with skin.

Reason 1:

Reason 2:

Content Domain

**Life Science**

Main Topic

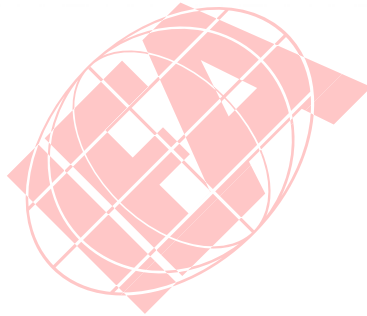
**Structure, function and life processes in organisms**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**



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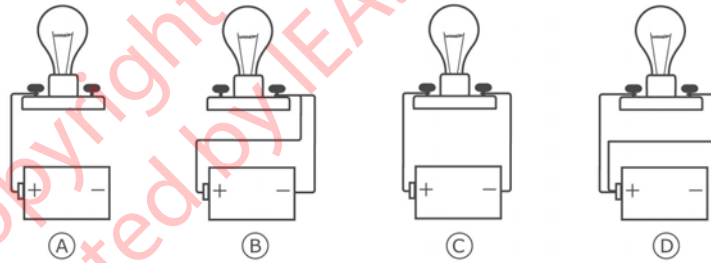
**A,B: Codes for each response**

**Note:** Each of the two responses is coded separately. Each correct diagnostic code (10,11,12,13,14) may be used only once. If the two responses are essentially the same, the second response should be coded as 79. For example, if a response mentions “protection from dirt” and “protection from germs”, the first response should be given a Code 10, and the second response should be given a Code 79. If only one response is given, the second should be coded as 99.

Code	Response	Item: S031241A,B
	<b>Correct Response</b>	
10	Gives a reason related to protection (against outside elements such as dirt, germs, water, sunlight, etc.). <i>Examples: To protect the insides from getting dust and grit in them. Skin can protect us from germs. Skin is waterproof. It protects the skeleton.</i>	
11	Gives a reason related to sweating or similar (excretion of water and/or salts). <i>Examples: You sweat from your skin.</i>	
12	Gives a reason related to sensing/feeling function (e.g., heat, cold, pain, pressure, etc.). <i>Examples: You feel the ground with your skin. The skin can sense hot and cold.</i>	
13	Gives a reason related to maintaining body temperature. <i>Examples: Skin helps to keep us warm. You lose heat through your skin. The fat layer keeps you warm.</i>	
14	Gives a reason related to the skin “containing” or “enclosing” other body parts (or similar). <i>Examples: It holds in the rest of the body. It keeps the blood inside. If you cut your skin, you bleed out. It keeps the insides from drying out.</i>	
19	Other correct	
	<b>Incorrect Response</b>	
70	Gives <b>only</b> a property/feature of skin. [No function stated.] <i>Examples: It's thin and delicate and can stretch. The skin has hair and freckles.</i>	
71	Gives a reason related <b>only</b> to appearance. <i>Examples: People would look too scary without skin. So that you cannot see their insides.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

The pictures show a lightbulb connected to a battery.  
Which bulb will light?



Content Domain

Physical Science

Main Topic

Electricity and magnetism

Cognitive Domain

Conceptual Understanding

Key

C

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**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Development and life cycle of organisms**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**



human



frog



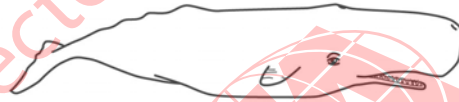
dog



butterfly



bird



whale

Some of the organisms shown above give birth to young that develop inside the mother. Some of the organisms have young that hatch from eggs that are laid outside the mother.

In the table below, write down the names of the organisms that belong to each group.

Organisms that give birth	Organisms that lay eggs

S031252

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**Note:** To receive full credit, ALL organisms must be classified correctly. Partial credit is given for responses with only one or two organisms missing or misclassified. If more than two organisms are missing or incorrect, then code 79 should be given.

Code	Response	Item: S031252
	<b>Correct Response</b>	
20	Organisms that give birth: <b>Human, Dog, Whale</b> Organisms that lay eggs: <b>Frog, Butterfly, Bird</b>	
	<b>Partial Response</b>	
10	One organism omitted or misclassified.	
11	Two organisms omitted or misclassified.	
	<b>Incorrect Response</b>	
79	Incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	



**TIMSS 2003**

Content Domain

**Physical Science**

Main Topic

**Classification and  
composition of matter**

Cognitive Domain

**Factual Knowledge**

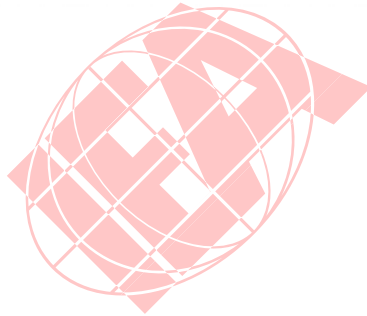
Key

**See scoring guide**

Many objects are made of metals (like copper, iron and gold).  
This is because metals have many useful properties.

A. Name one object that is made out of metal.

B. What property of the metal makes it useful for this object?



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**A: Codes for Metal Object**

Code	Response	Item: S031406A
	<b>Correct Response</b>	
<b>10</b>	Names an object made of metal. <i>Examples: Jewelry, money, electrical wires, magnet, pots/pans, cans, building materials (bridges, beams in buildings, steel rods), boats, cars, etc.</i>	
<b>19</b>	Other correct	
	<b>Incorrect Response</b>	
<b>70</b>	Only gives the name of a type of metal. <i>Examples: Copper, silver.</i>	
<b>79</b>	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
<b>99</b>	Blank	

**TIMSS 2003**

Content Domain

**Physical Science**

Main Topic

**Classification and  
composition of matter**

Cognitive Domain

**Conceptual Understanding**

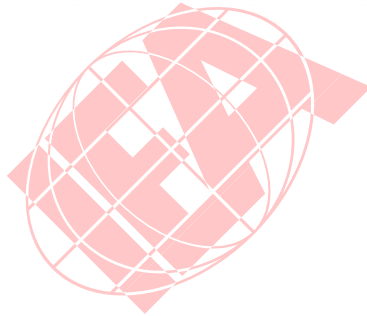
Key

**See scoring guide**

Many objects are made of metals (like copper, iron and gold).  
This is because metals have many useful properties.

A. Name one object that is made out of metal.

B. What property of the metal makes it useful for this object?



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**B: Codes for Property of Metal**

Code	Response	Item: S031406B
	<b>Correct Response</b>	
10	Names a correct property of metal that is clearly related to the use of the object named in part A. <i>Examples: It's shiny. (Part A: Bracelet); It conducts heat. (Part A: An Iron)</i> <i>Magnetic property. (Part A: Compass); Electricity can flow through it. (Part A: Wire)</i> <i>It can be hammered into thin sheets without breaking. (Part A: Kitchen foil)</i> <i>It is strong and will not break. (Part A: Pole)</i>	
19	Other correct	
	<b>Incorrect Response</b>	
70	Names only a type of metal that the object in Part A is made of. [No property identified.] <i>Examples: Silver (Part A: Bracelet); Copper (Part A: Wire); Iron (Part A: Magnet)</i> <i>Aluminum (Part A: Kitchen foil)</i>	
71	Names a <b>use</b> of the object named in Part A instead of a property of metal. <i>Examples: To sit on. (Part A: Desk); To cut with. (Part A: Scissors)</i> <i>It is used for money. (Part A: Coin)</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

## TIMSS 2003

Content Domain

Earth Science

Main Topic

Earth processes, cycles and history

Cognitive Domain

Reasoning and Analysis

Key

D

	Clouds in the Sky	Lowest Temperature	Highest Temperature
Town A	no	10°C	25°C
Town B	yes	20°C	30°C
Town C	no	-10°C	-1°C
Town D	yes	-15°C	5°C

The table above shows some weather information for four different towns during a 24-hour period. In which town did it most likely snow?

- (A) Town A
- (B) Town B
- (C) Town C
- (D) Town D

S031383

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## TIMSS 2003

Content Domain

Earth Science

Main Topic

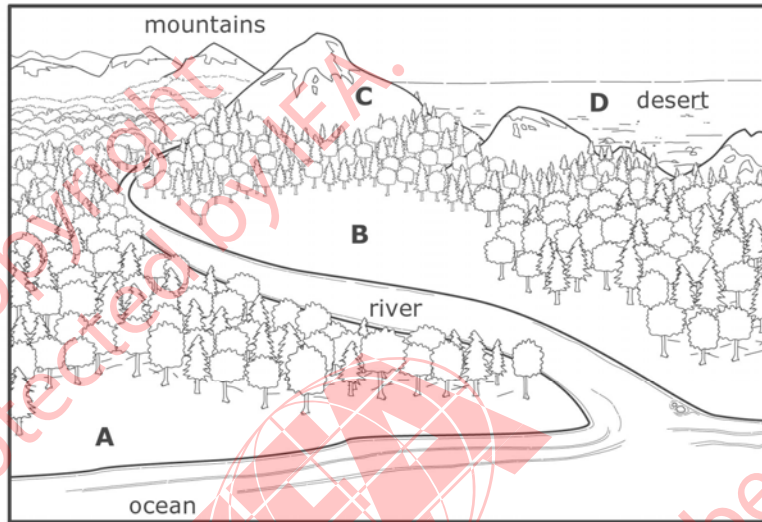
Earth's structure and  
physical features

Cognitive Domain

Reasoning and Analysis

Key

B



Look at the picture above. Where is the best location to grow crops?

- (A) Location A
- (B) Location B
- (C) Location C
- (D) Location D

S031379

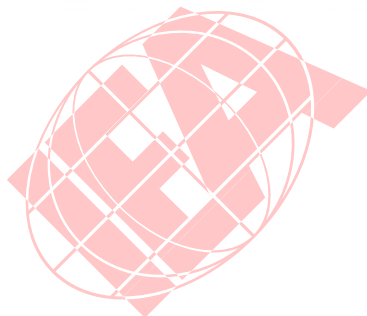
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## TIMSS 2003

Kate sees a full moon. About how much time will go by before the next full moon?

- (A) one week
- (B) two weeks
- (C) one month
- (D) one year

S031060



Content Domain

Earth Science

Main Topic

Earth in the solar system  
and universe

Cognitive Domain

Factual Knowledge

Key

C

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**TIMSS 2003**

A plant has yellow flowers. What best explains why the flowers are yellow?

- (A) The sunshine colored the flowers yellow.
- (B) The flowers of the parent plants were yellow.
- (C) It was very warm when they flowered.
- (D) It rained every day.

Content Domain

**Life Science**

Main Topic

**Reproduction and heredity**

Cognitive Domain

**Conceptual Understanding**

Key

**B**

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**TIMSS 2003**

Content Domain

**Life Science**

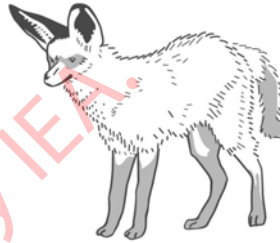
Main Topic

**Diversity, adaptation, and natural selection**

Cognitive Domain

**Reasoning and Analysis**

Key

**D**

Animals usually have physical features that help them live in certain places. Look at the picture shown above. This animal lives in a hot desert.

What physical feature does this animal have that helps it lose heat?

- (A) a thick coat of fur
- (B) a bushy tail
- (C) small eyes
- (D) large ears

S031284

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## TIMSS 2003

Content Domain

Life Science

Main Topic

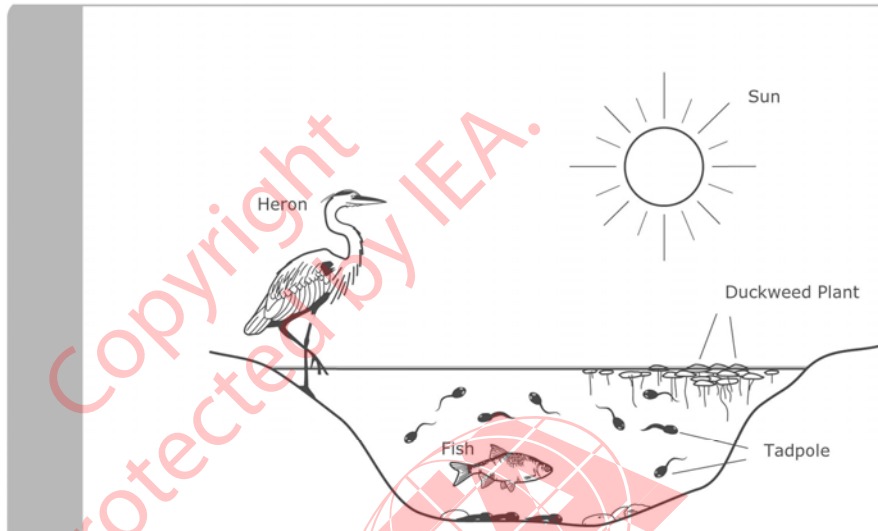
Ecosystems

Cognitive Domain

Factual Knowledge

Key

C



The picture above shows a pond and some of the organisms that live in and around the pond. They all depend on each other for food. The tadpole most likely gets its food from which of the following?

- (A) sun
- (B) fish
- (C) duckweed plant
- (D) heron

S031338

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**TIMSS 2003**

On a hot, humid day the air contains a lot of water vapor. What happens to the water vapor in the air when the air becomes very cold?

Content Domain

**Earth Science**

Main Topic

**Earth processes, cycles and history**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

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**Note:** Priority should be given to Code 10. If a response mentions condensation or freezing, then Code 10 should be given even if other correct codes apply. Responses that mention ONLY that the water vapor becomes cold or rises without any mention of a change of state (explicitly or implicitly) are scored as incorrect (Code 70 or 71).

Code	Response	Item: S031382
	<b>Correct Response</b>	
10	Refers to <b>condensation</b> or <b>freezing</b> (or equivalent). <i>Examples: It freezes.</i> <i>It condenses.</i> <i>Condensation.</i> <i>It condenses and turns into rain.</i>	
11	Mentions cloud formation or a form of precipitation (e.g., rain, snow, fog, etc.) <i>Examples: The water vapor changes to rain.</i> <i>It changes to snow.</i> <i>Water vapor turns into clouds.</i> <i>It rises into the clouds and becomes rain droplets.</i> <i>It turns foggy.</i> <i>It rains.</i>	
19	Other correct <i>Examples: It falls to the ground.</i>	
	<b>Incorrect Response</b>	
70	Mentions only that the water becomes cold. [No mention of a change of state or precipitation.] <i>Examples: The water vapor becomes cold.</i> <i>Its temperature drops.</i>	
71	Mentions only that water vapor rises (or similar). [No mention of condensation or precipitation.] <i>Examples: The water vapor will rise on a hot day.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples: It disappears.</i>	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Types, characteristics and classification of living things**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

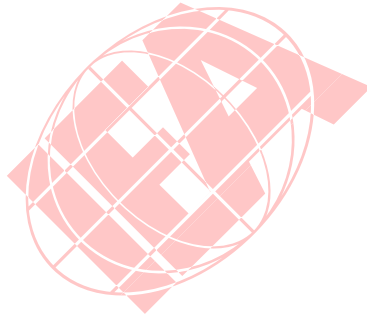
Are plants living or nonliving?

(Check one box.)

- Living
- Nonliving

Explain your answer.

S031218



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**Note:** To receive credit, responses must identify LIVING with a correct explanation. Credit is given both for higher-level responses based on reproduction, response to stimuli and cellular structure (Code 10) as well as less-sophisticated responses that refer only to basic needs, life/death cycle, growth and development, functions, or structural or behavioral features (Code 11). Priority should be given to Code 10. If reproduction, response to stimuli or cellular structure are included, then Code 10 should be given even if other correct codes also apply.

Code	Response	Item: S031218
	<b>Correct Response</b>	
10	<p><b>LIVING</b> with a correct explanation that refers to reproduction, response to stimuli or cellular structure (or similar).</p> <p><i>Examples: They reproduce.</i></p> <p><i>They respond to light (a stimulus).</i></p> <p><i>They are made up of cells.</i></p> <p><i>Plants can move, grow and reproduce.</i></p> <p><i>They reproduce and respond to changes.</i></p>	
11	<p><b>LIVING</b> with a correct explanation that refers to basic needs, life/death cycle, growth, movement, functions, etc.</p> <p><i>Examples: They make their own food.</i></p> <p><i>They breathe.</i></p> <p><i>They grow.</i></p> <p><i>They require air (oxygen).</i></p> <p><i>They need light to grow.</i></p> <p><i>They need air, water and food or they will die.</i></p> <p><i>They can die.</i></p> <p><i>They eat and drink.</i></p> <p><b>Note:</b> Some human terms for function are accepted as applied to plants even if they are not strictly correct. For example, 'breathe' is accepted as meaning that plants take in air (oxygen, carbon dioxide) and 'drink' is accepted as meaning that plants take in water.</p>	
19	Other correct	
	<b>Incorrect Response</b>	
70	<p><b>LIVING</b> with no explanation or an incorrect explanation.</p> <p><i>Examples: They are green.</i></p> <p><i>Because of sun and rain.</i></p>	
71	<b>NON-LIVING</b> with or without explanation.	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Kevin had a cold. Within a week some of his friends had colds.  
State two ways he could have passed his cold on to some of his friends.

1.

2.

Content Domain

**Life Science**

Main Topic

**Human health**

Cognitive Domain

**Factual Knowledge**

Key

**See scoring guide**

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**A,B: Codes for each response**

**Note:** Each of the two responses is coded separately. The same code may be used twice if they are based on general categories. However, if the two responses are essentially the same, the second response should be coded as 79. For example, if a response mentions “he touched them” and “they touched him”, the first response should be given Code 13, and the second response should be given Code 79. However, if the second response mentions “he *sneezed* on his desk and they touched it”, then the second response should be given Code 12. If only one response is given, the second should be coded as 99. Priority should be given to Code 10. If passing of ‘germs’, etc., is mentioned, then Code 10 should be used even if other correct codes also apply.

Code	Response	Item: S031326A,B
	<b>Correct Response</b>	
10	Mentions passing on his ‘germs’ (viruses, bacteria, or similar). [Explicit mode of transmission may or may not be stated.] <i>Examples: He gave his germs to them. Spreading germs. He could cough and get his germs on them.</i>	
11	Mentions coughing (on his friends).	
12	Mentions sneezing (on his friends).	
13	Mentions touching (Kevin touches his friends or vice-versa).	
14	Mentions specific activities that result in direct contact or transmission. <i>Examples: He might have breathed on them. They were sharing a bag of potato chips. They drank out of the same glass. By kissing.</i>	
19	Other correct	
	<b>Incorrect Response</b>	
70	Mentions <b>only</b> giving the cold to his friends, being close to his friends or an activity that places him in the proximity of his friends (or similar). [No mention of passing germs or mode of transmission given.] <i>Examples: His friends caught the cold from him. He was playing with them. He might have gotten too close and passed the cold to them. They were all eating together. He stayed overnight at their house.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	



## TIMSS 2003

Content Domain

Life Science

Main Topic

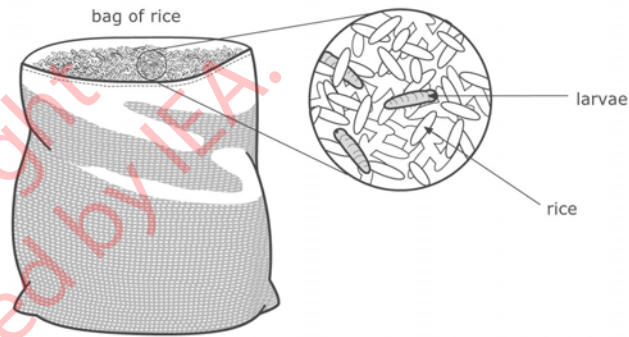
Development and life cycle of organisms

Cognitive Domain

Conceptual Understanding

Key

D



Larvae were found in a bag of rice. What best explains how the larvae got there?

- (A) They came from water in the bag.
- (B) They came from air in the bag.
- (C) They came from the rice itself.
- (D) They came from eggs laid by insects.

S031003

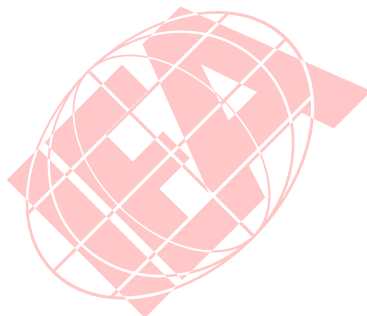
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## TIMSS 2003

Which of these things will dissolve in water?

- (A) iron filings
- (B) wood chips
- (C) sand
- (D) sugar

S031035



Content Domain

Physical Science

Main Topic

Classification and composition of matter

Cognitive Domain

Factual Knowledge

Key

D

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## TIMSS 2003

Which of these activities will result in a different kind of material being formed?

- (A) A nail is left outside and it rusts.
- (B) A glass is dropped and it shatters into small pieces.
- (C) A rubber band is stretched until it breaks.
- (D) A pencil is sharpened to a point.

Content Domain

Physical Science

Main Topic

Chemical change

Cognitive Domain

Conceptual Understanding

Key

A

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**TIMSS 2003**

Describe one difference between solids and liquids.

Content Domain

**Physical Science**

Main Topic

**Physical states and changes in matter**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

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**Note:** Priority should be given to Code 10 then Code 11. If a response mentions arrangement and/or speed of particles, then Code 10 should be given even if other correct codes also apply. Code 12 should be given only if neither Code 10 or 11 apply. Correct responses based on changes of state should be given Code 19.

Code	Response	Item: S031370
	<b>Correct Response</b>	
10	Refers to differences in arrangement (space, distance) or speed of particles (molecules). <i>Examples: In solids molecules are packed together.</i> <i>Liquid particles are more spread out and fast.</i>	
11	Refers to solids having a fixed shape OR liquids taking the shape of their container (or similar) <i>Examples: Liquids can fill the shape of any container, solids can not.</i> <i>A liquid can take any form.</i>	
12	Refers to solids as hard OR liquids as soft, wet, flowing, runny, poured (or similar). <i>Examples: Solids can't spill and liquids can.</i> <i>Liquids can be poured.</i> <i>You can drink liquids, you cannot drink solids.</i> <i>Solids are hard and liquids are soft.</i>	
19	Other correct <i>Examples: Solids can be melted into liquid, but liquids are already liquid.</i>	
	<b>Incorrect Response</b>	
70	Refers only to examples of solids/liquids with no or incorrect property given. <i>Examples: Water is a liquid and ice is a solid.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task) <i>Examples: Solids are cold.</i> <i>One is harder than the other.</i> <i>A solid is strong.</i>	
	<b>Nonresponse</b>	
99	Blank	

## TIMSS 2003

Content Domain

Physical Science

Main Topic

Forces and motion

Cognitive Domain

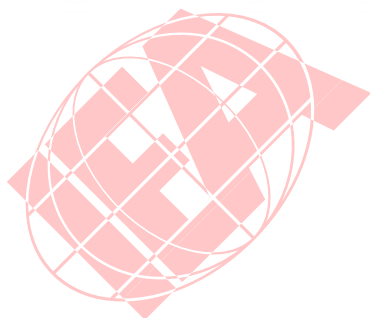
Factual Knowledge

Key

B

Which of the following can make objects repel each other?

- (A) gravity
- (B) magnetism
- (C) both gravity and magnetism
- (D) neither gravity nor magnetism



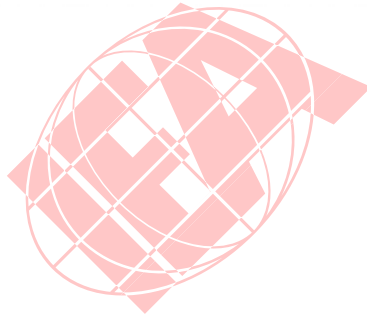
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**TIMSS 2003**

Which statement is true for all objects?

- (A) All objects are shiny.
- (B) All objects are hard.
- (C) All objects are rough.
- (D) All objects have mass.

S031409



Content Domain

**Physical Science**

Main Topic

**Classification and composition of matter**

Cognitive Domain

**Factual Knowledge**

Key

**D**

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**TIMSS 2003**

Minerals are used for making many things including jewelry, chalk, and concrete. Where do we get the minerals needed to make these things?

- (A) from air
- (B) from wood
- (C) from rocks
- (D) from crops

Content Domain

**Earth Science**

Main Topic

**Use and conservation of natural resources**

Cognitive Domain

**Factual Knowledge**

Key

**C**

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**TIMSS 2003**

Content Domain

**Physical Science**

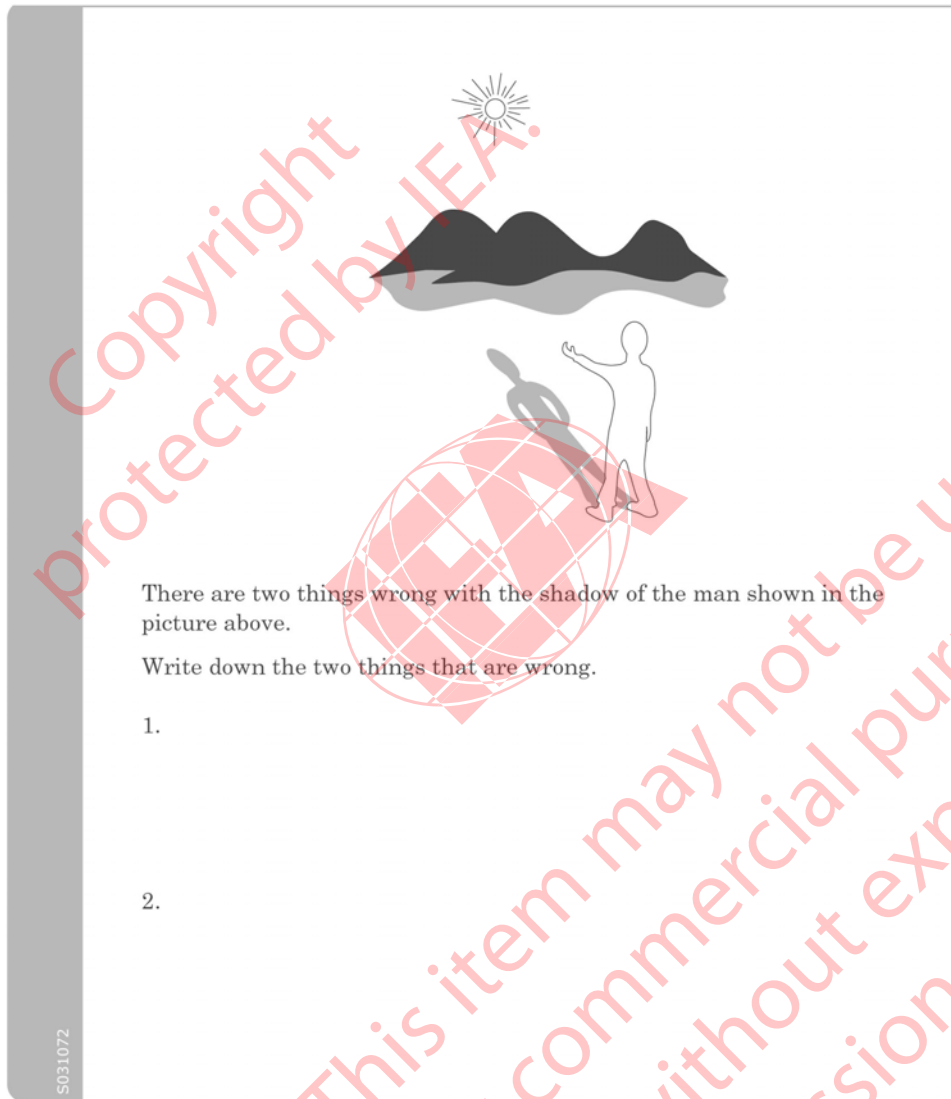
Main Topic

**Light**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

There are two things wrong with the shadow of the man shown in the picture above.

Write down the two things that are wrong.

1.

2.

S031072

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**Note:** To receive full credit, responses must identify an error in both the direction/angle and the pose of the shadow of the man.

Direction/angle: shadow should be on the other side of the man away from the sun.

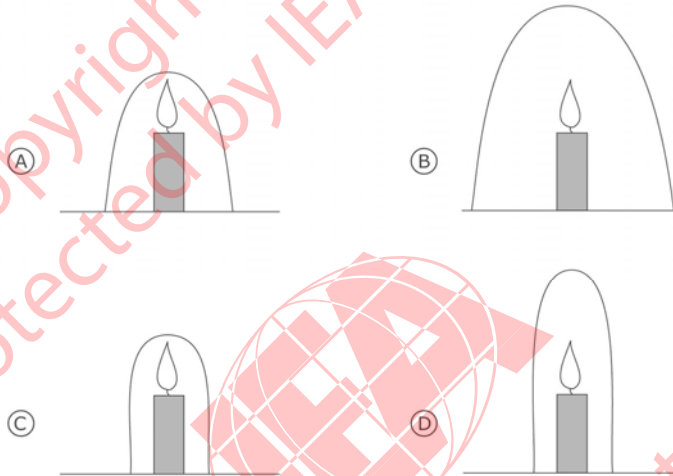
Pose: shadow of the left hand should be raised; shadow on the right hand should be down at his side

Partial credit is given for responses that address only one of these factors. Statements about the shadow of the mountains do not contribute to the correctness of the score.

Code	Response	Item: S031072
	<b>Correct Response</b>	
20	Identifies an error in BOTH the <b>direction/angle</b> and the <b>pose</b> of the shadow of the man. <i>Examples: The shadow should have the man raising one hand. The shadow should be opposite the sun. The man's hand is sticking out, but the shadow is not. The shadow is not behind him. The position of the shadow is wrong. The shape of the shadow is wrong. The man has his arm out and the shadow has it on his hip. The shadow is on the side facing the sun.</i>	
29	Other fully correct	
	<b>Partial Response</b>	
10	Identifies only the <b>direction/angle</b> of the shadow of the man. [No mention of the pose.] <i>Examples: The shadow is on the wrong side of the man. The hill has a bump, but its shadow has a curve.</i>	
11	Identifies only the <b>pose</b> of the shadow of the man. [No mention of the direction/angle.] <i>Examples: He put out his hand, but the shadow did not show it right. His other hand is straight but the shadow is not.</i>	
19	Other partially correct	
	<b>Incorrect Response</b>	
70	Response too vague. <i>Examples: The shadow of the man. The shadow of the hill. The hands. The head.</i>	
79	Incorrect (including crossed out/erased, stray marks, illegible or off task) <i>Examples: He has no hair. He has no face.</i>	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

The pictures below show four identical burning candles. Each is covered by a glass container of a different size. Which candle flame will be the **last** to go out?



S031061

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Content Domain

**Physical Science**

Main Topic

**Chemical change**

Cognitive Domain

**Conceptual Understanding**

Key

**B**

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**Garden**

Instructions: The next five questions are about a garden. To answer these questions you may use any pictures and tables shown on the pages in the Garden section.

**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Ecosystems**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

Rebecca moved into a new house. She wanted to grow plants in different areas of her garden.

- A. Rebecca knows that plants need light to grow.  
Why do plants need light to grow?

- B. Plants also need water to grow.  
Name one other thing plants need in order to grow well.

Questions for Garden continue. 

S031439

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**A: Codes for Why Plants Need Light**

**Note:** Priority should be given to Code 10. If a response mentions photosynthesis or plants making their own food, then Code 10 should be given even if other correct codes also apply.

Code	Response	Item: S031439A
	<b>Correct Response</b>	
10	States that plants need light in order undergo <b>photosynthesis</b> OR <b>make their own food</b> (or similar). <i>Examples: Plants make food using light.</i> <i>It's for photosynthesis.</i> <i>They won't make food if there is no light.</i> <i>To make food</i> <i>Sunlight gives them food.</i> <i>Plants get their food using sunlight.</i>	
11	States that plants need light for energy (or similar). <i>Examples: Sunlight is the source of energy for all living things.</i> <i>The Sun warms the plant and gives it energy.</i> <i>They turn the Sun's rays into energy.</i> <i>Plants get energy from the Sun.</i>	
19	Other correct	
	<b>Incorrect Response</b>	
70	Gives only a general response related to plants needing light in order to live/grow (given in the stem). <i>Examples: Plants will wilt and die without light.</i> <i>They cannot grow without it.</i> <i>To live.</i> <i>Light makes it grow.</i>	
71	Mentions <b>only</b> the need for heat/warmth. [No mention of energy.] <i>Examples: The heat from the sun helps them grow.</i> <i>Living things need warmth.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Types, characteristics and classification of living things**

Cognitive Domain

**Factual Knowledge**

Key

**See scoring guide**

Rebecca moved into a new house. She wanted to grow plants in different areas of her garden.

- A. Rebecca knows that plants need light to grow.  
Why do plants need light to grow?

- B. Plants also need water to grow.  
Name one other thing plants need in order to grow well.

Questions for Garden continue. 

S031439

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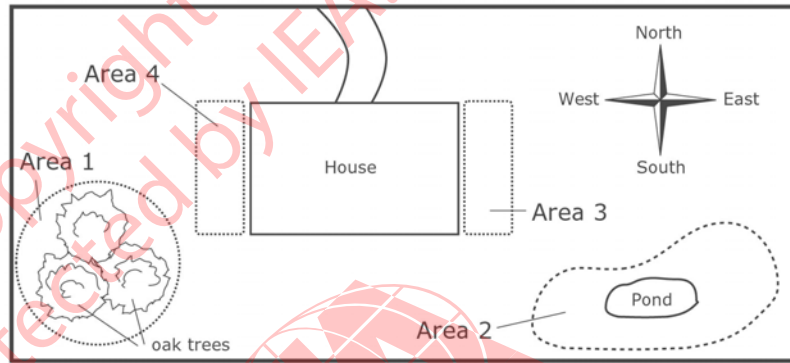
**B: Codes for One Other Thing Plants Need**

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

Code	Response	Item: S031439B
	<b>Correct Response</b>	
<b>10</b>	States fertilizer, nutrients, minerals, plant 'food' (or similar term meaning nutrients).	
<b>11</b>	States air (oxygen or carbon dioxide).	
<b>12</b>	States soil, dirt, earth (or similar).	
<b>13</b>	States proper temperature (heat, warmth, etc.).	
<b>19</b>	Other correct	
	<b>Incorrect Response</b>	
<b>70</b>	Repeats light, sunlight or Sun.	
<b>71</b>	Repeats water, moisture or similar.	
<b>79</b>	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
<b>99</b>	Blank	

**TIMSS 2003**

A plan of Rebecca's house and garden is shown below. There are four areas in the garden where she would like to grow some plants (Areas 1, 2, 3, and 4).



Which side of Rebecca's house will receive the most sun in the morning?

(Check one box.)

- East side (Area 3)
- West side (Area 4)

Explain your answer.

Questions for Garden continue. ➔

S031440

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Content Domain

**Earth Science**

Main Topic

**Earth in the solar system and universe**

Cognitive Domain

**Reasoning and Analysis**

Key







**See scoring guide**



Code	Response	Item: S031440
	<b>Correct Response</b>	
10	<b>EAST</b> with explanation stating that the Sun rises in the East (or similar). <i>Examples: East. The Sun comes up on the East side.</i> <i>East. The Sun travels from East to West.</i> <i>East. When the sun comes up on that side it makes a shadow on the west side.</i> <i>East. Area 4 is shaded in the morning because the Sun in on the East side.</i>	
19	Other correct	
	<b>Incorrect Response</b>	
70	<b>EAST</b> with no explanation or incorrect explanation. [May include a true statement that does not answer the question.] <i>Examples: East. Because it is closest to the pond.</i> <i>East. Because it's on the East side.</i> <i>East. Because the Sun travels across the sky.</i>	
71	<b>WEST</b> with an explanation stating that the Sun rises in the West (or similar). <i>Examples: West. When the sun rises in the morning it's on the west.</i>	
72	<b>WEST</b> with no explanation or other incorrect explanation. <i>Examples: West. The oak trees are there.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	

TIMSS 2003

Rebecca wanted to plant each area with different types of plants. She collected pictures of her favorite plants and found out how much sunlight they needed to grow well. She put the pictures and the information she found into a scrap book as shown below.

Light needed to grow well		Light needed to grow well	
Fern 	Shade	Shrub 	Afternoon sun
Rose 	Sun all day	Shooting Star 	Morning sun
Wood rush 	Part shade	Tomato plant 	Sun all day

- A. Rebecca wanted to grow roses in Area 1 under the oak trees. Her friend Gwen disagreed and told her that the roses would **not** grow well in Area 1. Explain why Gwen says this.

This Garden question continues. 

Content Domain

Life Science

Main Topic

Ecosystems

Cognitive Domain

Reasoning and Analysis

Key

See scoring guide

S031441\_1

**A: Codes for Why Roses Will Not Grow in Area 1**

**Note:** A correct code will be given for responses that refer to the amount of light or shade in Area 1 either explicitly or implicitly by referring to the need for sun given in the information in the scrap book. Responses that refer to the oak trees WITHOUT any mention of light or shade are scored as incorrect (Code 70).

Code	Response	Item: S031441A
	<b>Correct Response</b>	
10	<p>Refers to there not being enough light (or too much shade) in Area 1 for the roses to grow (explicitly or implicitly).</p> <p><i>Examples: Because the oak trees will block out the sun.</i></p> <p><i>The trees will provide too much shade.</i></p> <p><i>There isn't much light in Area 1.</i></p> <p><i>Roses need lots of sun to grow.</i></p> <p><i>Because it needs sun all day.</i></p> <p><i>They would not get much sun.</i></p> <p><i>Too much shade.</i></p>	
19	Other correct	
	<b>Incorrect Response</b>	
70	<p>Refers <b>only</b> to the oak trees. [No explicit reference to light/shade.]</p> <p><i>Examples: Because of the oak trees.</i></p> <p><i>There is no room for roses under the oak trees.</i></p> <p><i>The oak trees soak up all the water.</i></p>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Content Domain

Life Science

Main Topic

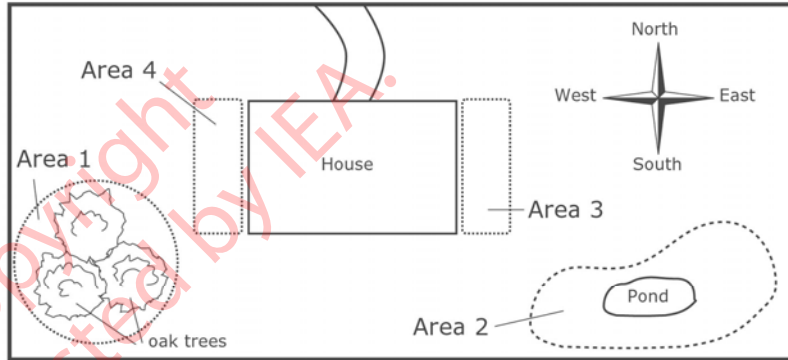
Ecosystems

Cognitive Domain

Reasoning and Analysis

Key

See scoring guide



B. Look at the information for each plant given in Rebecca's scrap book and the plan of her garden above. Write the names of the plants that would grow best in each area in the boxes below.

Area 1
Area 2
Area 3
Area 4

Questions for Garden continue. ➔

S031441\_2

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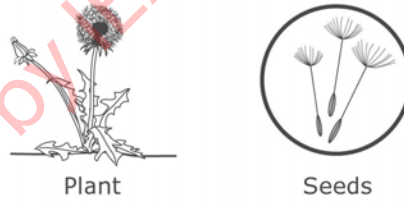
**B: Codes for Plants that Will Grow in Each Area**

**Note:** For full credit, responses must list only correct plant(s) in all four areas as specified in Code 20. An area is counted as correct as long as at least one correct plant and no incorrect plants are placed in that area. Partial credit is given for responses that include correct plants in one, two or three areas. Responses should be consistent with the answer to the previous question indicating morning sun in the East or West (S13-06). If West is identified in S13-06, then the plant(s) listed in Areas 3 and 4 should be reversed from that indicated in Code 20 in order for Areas 3 and 4 to be counted as correct. For example, full credit is given for responses that list correct plants in Areas 1 and 2 but reverse the plants in Areas 3 and 4 (Code 21) as long as this is consistent with an incorrect response to the previous question identifying that the Sun rises in the West (Code 71 or 72 for S13\_06). Similarly, responses that list incorrect plants in Areas 1 and 2 with reversed plants in Areas 3 and 4 consistent with an incorrect response of West to S13\_06 should be given partial credit (Code 10).

Code	Response	Item: S031441B
	<b>Correct Response</b>	
<b>20</b>	Identifies the correct plant(s) in all four areas: Area 1 (shade or part shade): fern or wood rush Area 2 (sun all day): rose or tomato plant Area 3 (morning sun or part shade): shooting star or wood rush Area 4 (afternoon sun or part shade): shrub or wood rush [Consistent with correct identification of morning sun on the East (Area 3) given in previous question (Code 10 or 70 for S13-06).]	
<b>21</b>	As in Code 20 but plants in Areas 3 and 4 are reversed. [Consistent with an incorrect identification of morning sun on the West (Area 4) given in previous question (Code 71 or 72 for S13_06).]	
	<b>Partial Response</b>	
<b>10</b>	Identifies correct plants in at least one area but less than four areas.	
	<b>Incorrect Response</b>	
<b>79</b>	Incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
<b>99</b>	Blank	

## TIMSS 2003

Rebecca planted her garden. After a few months, she noticed some plants growing that she had not planted. She knew that the plants must have grown from seeds. She collected some seeds from one of the plants. The plant and seeds are shown in the picture below.



How did the seeds most likely get into her garden?

Questions for Garden continue. 

Content Domain

Life Science

Main Topic

Structure, function and life processes in organisms

Cognitive Domain

Reasoning and Analysis

Key

See scoring guide

S031442

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Code	Response	Item: S031442
	<b>Correct Response</b>	
10	States that the seeds were blown into the garden (by the wind) or similar. <i>Examples: The wind blew them.</i> <i>They flew into the garden.</i> <i>They were carried through the air.</i> <i>Someone blew the plant for wishes and the seeds flew off.</i>	
19	Other correct <i>Examples: Birds could have dropped them.</i>	
	<b>Incorrect Response</b>	
70	States only that someone planted the seeds there (or similar). <i>Examples: Rebecca must have planted them and forgot about it.</i> <i>Somebody else put them there.</i>	
71	States only that the seeds came from a plant. [No method of dispersal included.] <i>Examples: The seeds fell from the plant.</i> <i>Some other plants might have grown the seeds.</i> <i>She got them from another plant.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible or off task)	
	<b>Nonresponse</b>	
99	Blank	

**TIMSS 2003**

Content Domain

**Life Science**

Main Topic

**Development and life cycle of organisms**

Cognitive Domain

**Conceptual Understanding**

Key

**See scoring guide**

Rebecca noticed that the leaves on her rose bushes were getting eaten by insects as shown in the picture below.



Rebecca was planning to use insect spray to kill the insects. Her friend Gwen said that the insect spray might kill other insects that are important for some of the flowering plants in the garden.

Why are some insects important for flowering plants?

End of Garden section. ●

S031443

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**Note:** To receive credit, responses must state a specific benefit to plants. Credit is given both for pollination or reproduction in flowering plants (Code 10) as well as other more general benefits of ‘insects’ in gardens (Code 11). Responses that refer to *pollen* but with no or inadequate description of the benefit to plants are scored as incorrect (Code 72). Specific organisms named (e.g., worms, spiders) do not have to be ‘insects’ in order to be considered as correct as long as the benefit to plants is correct. If more than one response is given, the code corresponding to the first correct response should be assigned. Since only one response was asked for, the incorrect portion of a response will not be considered as long as it does not negate the correct portion.

Code	Response	Item: S031443
	<b>Correct Response</b>	
10	States that some insects (e.g., butterflies, bees) are needed for pollination or reproduction of plants (or similar). <i>Examples: Bees carry the pollen from one flower to another flower. Some insects are important because plants can't reproduce without them. They take the pollen to others of the same species. Bees pollinate the plants.</i>	
11	States that some insects eat other insects that are bad for plants (or similar). <i>Examples: They will eat all the bad bugs in the garden. Some insects are important because they eat other insects. Spiders and ladybugs will eat the bugs that are killing the plants.</i>	
19	Other correct <i>Examples: Worms dig into the soil and bring in air for the plants.</i>	
	<b>Incorrect Response</b>	
70	Gives only a general/vague response related to insects helping plants with inadequate description. <i>Examples: Some insects are helpful to plants. They need them to grow.</i>	
71	Names a specific insect important to plants but with no specific benefit to plants given. <i>Examples: Bees, ladybugs, butterflies, etc.</i>	
72	Refers to <b>pollen</b> but with no or inadequate description of the benefit to plants. <i>Examples: Bees need pollen. Bees are for pollen. They produce the right kind of pollen for the plant.</i>	
79	Other incorrect (including crossed out/erased, stray marks, illegible, or off task)	
	<b>Nonresponse</b>	
99	Blank	