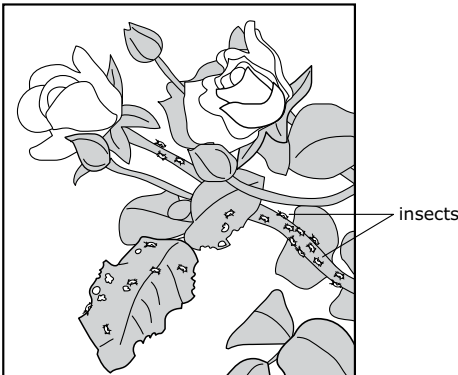


Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Development and Life Cycle of Organisms	Conceptual Understanding

Garden: why insects are important for flowering plants

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?

Overall Percent Correct

Russian Federation	41	▲
Hungary	39	▲
Latvia	37	▲
Netherlands	33	▲
Italy	28	▲
Lithuania	28	▲
United States	27	▲
Australia	26	○
Chinese Taipei	24	○
Japan	24	○
Belgium (Flemish)	24	○
England	22	○
Slovenia	21	○
International average	21	
Hong Kong, SAR	19	○
New Zealand	19	○
Singapore	18	○
Moldova, Republic of	17	○
Cyprus	14	▼
Iran, Islamic Republic of	14	▼
Armenia	13	▼
Norway	10	▼
Philippines	10	▼
Scotland	10	▼
Morocco	5	▼
Tunisia	3	▼

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

Item Number: S031443

SCORING

Note: To receive credit, responses must state a specific benefit to plants. Credit is given both for pollination or reproduction in flowering plants as well as other more general benefits of 'insects' in gardens. Responses that refer to *pollen* but with no or inadequate description of the benefit to plants are scored as incorrect. 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.

Garden: why insects are important for flowering plants (continued)

Item Number: S031443

SCORING (continued)

Correct Response

- States that some insects (e.g., butterflies, bees) are needed for pollination or reproduction of plants (or similar).
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.
- States that some insects eat other insects that are bad for plants (or similar).
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.
- Other correct
Examples: Worms dig into the soil and bring in air for the plants.

Incorrect Response

- Gives only a general/vague response related to insects helping plants with inadequate description.
Examples: Some insects are helpful to plants.
They need them to grow.
- Names a specific insect important to plants but with no specific benefit to plants given.
Examples: Bees, ladybugs, butterflies, etc.
- Refers to pollen but with no or inadequate description of the benefit to plants.
Examples: Bees need pollen.
Bees are for pollen.
They produce the right kind of pollen for the plant.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

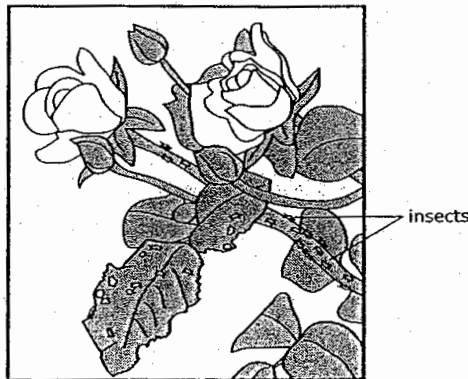
Garden: why insects are important for flowering plants (continued)

Item Number: S031443

Student Responses

Correct Response:

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?

Some insects are important because they help pollinate flowers

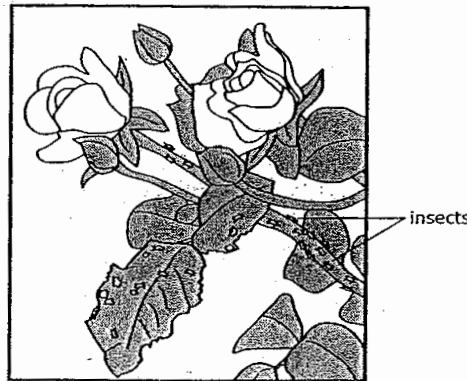
Garden: why insects are important for flowering plants (continued)

Item Number: S031443

Student Responses (continued)

Incorrect Response:

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.


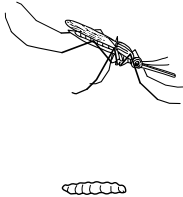
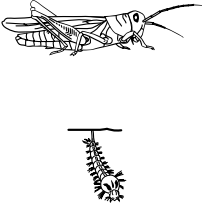

Why are some insects important for flowering plants?

Bee's are important because they need pollen.

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Development and Life Cycle of Organisms	Factual Knowledge

Insect correctly paired with its young form

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

Housefly	Mosquito	Grasshopper	Butterfly
			
(A)	(B)	(C)	(D)

Overall Percent Correct

United States	91	▲
Singapore	90	▲
Japan	89	▲
Australia	84	▲
England	84	▲
Russian Federation	82	▲
New Zealand	81	▲
Hungary	80	▲
Chinese Taipei	79	▲
Norway	79	▲
Scotland	78	○
Hong Kong, SAR	76	○
Belgium (Flemish)	75	○
Latvia	74	○
Netherlands	73	○
International average	73	
Cyprus	72	○
Italy	71	○
Moldova, Republic of	70	○
Slovenia	69	○
Lithuania	66	▼
Philippines	62	▼
Armenia	55	▼
Iran, Islamic Republic of	51	▼
Tunisia	26	▼
Morocco	0	▼

Country average vs. International average:

- Higher ▲
- Not different ○
- Lower ▼

Item Number: S031017

Correct Response:	D
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Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Diversity, Adaptation, and Natural Selection	Factual Knowledge

Plant found in tropical rain forest

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

(A) (B) (C) (D)

Item Number: S031287

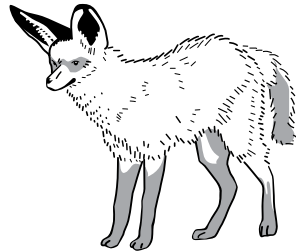
Overall Percent Correct		
Netherlands	92	▲
Hungary	88	▲
United States	86	▲
Latvia	85	▲
Australia	82	▲
Lithuania	81	▲
England	80	▲
Belgium (Flemish)	80	▲
Italy	79	▲
Moldova, Republic of	77	▲
Russian Federation	73	▲
Scotland	71	▲
New Zealand	70	▲
Norway	67	▲
Singapore	65	○
International average	63	
Chinese Taipei	62	○
Hong Kong, SAR	54	▼
Slovenia	47	▼
Armenia	41	▼
Japan	39	▼
Philippines	38	▼
Cyprus	35	▼
Iran, Islamic Republic of	29	▼
Morocco	26	▼
Tunisia	23	▼

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

Correct Response:	B
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Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Diversity, Adaptation, and Natural Selection	Reasoning and Analysis

Physical feature to get rid of body heat



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

Overall Percent Correct

Lithuania	52	▲
Latvia	48	▲
Scotland	48	▲
United States	44	▲
England	44	▲
Norway	41	▲
New Zealand	40	▲
Australia	38	○
Russian Federation	37	○
Slovenia	36	○
Japan	35	○
Belgium (Flemish)	35	○
Netherlands	34	○

International average	33	
Chinese Taipei	29	▼
Morocco	29	○
Hong Kong, SAR	28	▼
Cyprus	23	▼
Singapore	23	▼
Philippines	22	▼
Armenia	20	▼
Italy	18	▼
Tunisia	18	▼
Iran, Islamic Republic of	12	▼
Hungary	0	▼
Moldova, Republic of	0	▼

Country average vs. International average:

- Higher ▲
- Not different ○
- Lower ▼

Item Number: S031284

Correct Response:	D
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Content Domain	Main Topic	Cognitive Domain
A. LIFE SCIENCE B. LIFE SCIENCE	Ecosystems Types, Characteristics, and Classification of Living Things	Conceptual Understanding Factual Knowledge

Garden: why plants need light to grow

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.

Item Number: S031439A

Overall Percent Correct

Singapore	69	▲
Hong Kong, SAR	40	▲
Chinese Taipei	32	▲
Italy	28	▲
United States	25	▲
Hungary	20	○
Moldova, Republic of	20	○
England	20	○
International average	16	
Iran, Islamic Republic of	15	○
Armenia	14	○
Japan	13	▼
Latvia	13	○
Netherlands	12	▼
Lithuania	11	▼
Philippines	11	▼
Australia	10	▼
Cyprus	9	▼
Russian Federation	9	▼
New Zealand	8	▼
Norway	7	▼
Slovenia	6	▼
Scotland	6	▼
Belgium (Flemish)	6	▼
Tunisia	5	▼
Morocco	3	▼

SCORING

Correct Response

- States that plants need light in order to undergo photosynthesis OR make their own food (or similar).

Examples: *Plants make food using light.*

It's for photosynthesis.

They won't make food if there is no light.

To make food

Sunlight gives them food.

Plants get their food using sunlight.

- States that plants need light for energy (or similar).
- Examples: *Sunlight is the source of energy for all living things.*
The Sun warms the plant and gives it energy.
They turn the Sun's rays into energy.
Plants get energy from the Sun.

- Other correct

Incorrect Response

Gives only a general response related to plants needing light in order to live/grow (given in the stem).

Examples: *Plants will wilt and die without light.*

They cannot grow without it.

To live.

Light makes it grow.

- Mentions **only** the need for heat/warmth. [No mention of energy.]
Examples: *The heat from the sun helps them grow.*
Living things need warmth.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Country average vs.
International average:

Higher	▲
Not different	○
Lower	▼

Garden: why plants need light to grow (continued)

Item Number: S031439A

Student Responses

Correct Response:

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?

They need it so they can
do harsh photosynthesis.

Incorrect Response:

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?

Because heat makes
things bigger

Content Domain	Main Topic	Cognitive Domain
A. LIFE SCIENCE B. LIFE SCIENCE	Ecosystems Types, Characteristics, and Classification of Living Things	Conceptual Understanding Factual Knowledge

Garden: one other thing plants need to grow

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.

Item Number: S031439B

SCORING**Correct Response**

- States fertilizer, nutrients, minerals, plant 'food' (or similar term meaning nutrients).
- States air (oxygen or carbon dioxide).
- States soil, dirt, earth (or similar).
- States proper temperature (heat, warmth, etc.).
- Other correct

Incorrect Response

- Repeats light, sunlight or Sun.
- Repeats water, moisture or similar.
- Other incorrect (including crossed out/erased, stray marks, illegible or off task)

Overall Percent Correct

Japan	67	▲
Singapore	66	▲
Netherlands	64	▲
England	64	▲
United States	61	▲
Hungary	57	▲
Latvia	57	▲
Australia	55	▲
Chinese Taipei	51	▲
Iran, Islamic Republic of	50	○
Slovenia	50	○
Scotland	49	○
Hong Kong, SAR	48	○
New Zealand	48	○
Italy	45	○
International average	45	
Russian Federation	43	○
Belgium (Flemish)	42	○
Norway	38	▼
Lithuania	35	▼
Cyprus	32	▼
Moldova, Republic of	30	▼
Tunisia	27	▼
Armenia	22	▼
Philippines	15	▼
Morocco	11	▼

**Country average vs.
International average:**

Higher	▲
Not different	○
Lower	▼

Garden: one other thing plants need to grow (continued)

Item Number: S031439B

Student Responses

Correct Response:

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

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

They need carbon dioxide.

Incorrect Response:

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

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

c. they need shade and sun

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Factual Knowledge

Herbivorous animal

Which animal eats only plants?

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

Overall Percent Correct

Hungary	99	▲
Latvia	98	▲
Russian Federation	98	▲
Lithuania	97	▲
Chinese Taipei	95	▲
Hong Kong, SAR	95	▲
Italy	95	▲
Singapore	95	▲
Armenia	94	○
Cyprus	94	▲
Netherlands	94	○
New Zealand	94	○
Slovenia	94	○
United States	94	▲
Australia	92	○
Norway	92	○
England	92	○
Belgium (Flemish)	92	○
International average	92	
Moldova, Republic of	91	○
Japan	90	▼
Scotland	90	▼
Iran, Islamic Republic of	88	▼
Morocco	82	▼
Tunisia	82	▼
Philippines	77	▼

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

Item Number: S011010

Correct Response:	D
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Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Factual Knowledge

Where tadpole gets its food

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

Item Number: S031338

Overall Percent Correct

Chinese Taipei	90	▲
Japan	87	▲
Italy	84	▲
Belgium (Flemish)	84	▲
Singapore	83	▲
England	83	▲
Scotland	82	▲
Lithuania	81	▲
Netherlands	81	▲
Russian Federation	81	▲
United States	81	▲
Australia	80	▲
Hong Kong, SAR	79	▲
Hungary	78	▲
Moldova, Republic of	77	▲
New Zealand	76	▲
Norway	73	○
International average	72	
Cyprus	65	▼
Slovenia	65	▼
Latvia	61	▼
Iran, Islamic Republic of	57	▼
Armenia	49	▼
Morocco	47	▼
Philippines	43	▼
Tunisia	35	▼

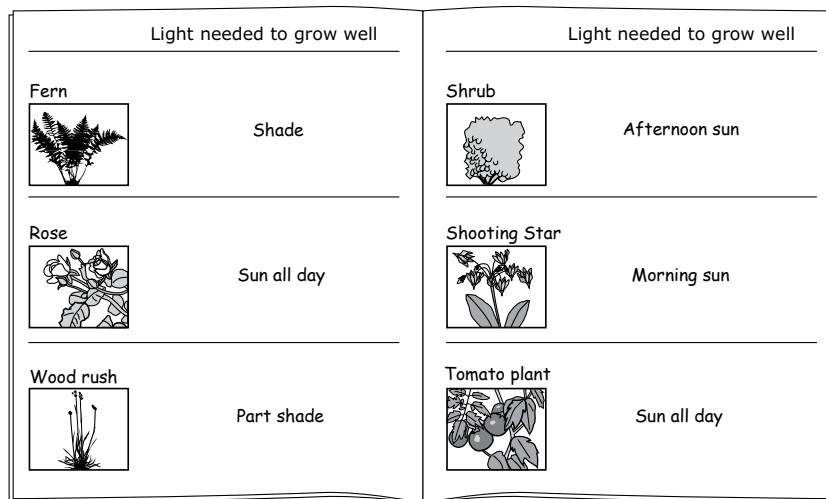
Country average vs. International average:	
Higher	▲
Not different	○
Lower	▼

Correct Response:	C
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Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Reasoning and Analysis

Garden: why roses will not grow under oak trees

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.



- 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.

Continued

Item Number: S031441A

Overall Percent Correct

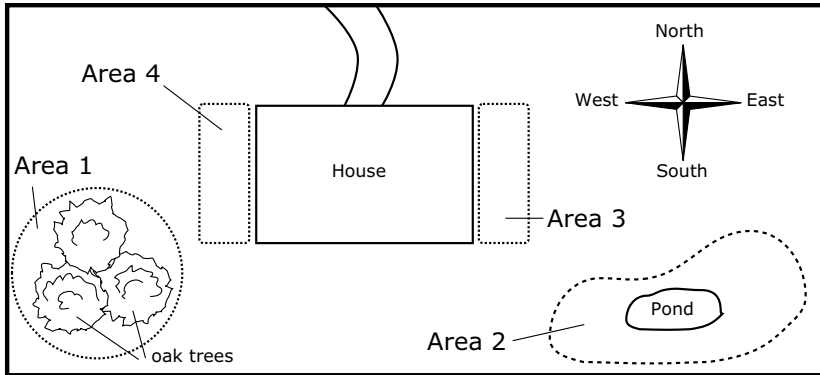
Netherlands	82	▲
Chinese Taipei	78	▲
Japan	77	▲
Singapore	77	▲
England	75	▲
Latvia	72	▲
Belgium (Flemish)	72	▲
United States	71	▲
Australia	70	▲
Hungary	70	▲
New Zealand	67	▲
Hong Kong, SAR	63	▲
Lithuania	60	○
Russian Federation	60	○
Scotland	57	○
International average	55	
Slovenia	52	○
Italy	51	○
Moldova, Republic of	50	○
Cyprus	43	▼
Norway	42	▼
Iran, Islamic Republic of	27	▼
Philippines	19	▼
Armenia	17	▼
Tunisia	9	▼
Morocco	8	▼

Country average vs. International average:

Higher	▲
Not different	○
Lower	▼

Garden: why roses will not grow under oak trees (continued)

Item Number: S031441A



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	

Item Number: S031441A

Garden: why roses will not grow under oak trees (continued)

Item Number: S031441A

SCORING

Note: 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 should be scored as correct. Responses that refer to the oak trees WITHOUT any mention of light or shade are scored as incorrect.

Correct Response

- Refers to there not being enough light (or too much shade) in Area 1 for the roses to grow (explicitly or implicitly).

Examples: Because the oak trees will block out the sun.

The trees will provide too much shade.

There isn't much light in Area 1.

Roses need lots of sun to grow.

Because it needs sun all day.

They would not get much sun.

Too much shade.

- Other correct

Incorrect Response

- Refers only to the oak trees. [No explicit reference to light/shade.]

Examples: Because of the oak trees.

There is no room for roses under the oak trees.

The oak trees soak up all the water.

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







Garden: why roses will not grow under oak trees (continued)

Item Number: S031441A

Student Responses

Correct Response:

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. Gwen said that because in Rebecca's scrap book it says that roses have to have sun all day long, and under the shady oak trees there's just shade no sun can really get to the roses!







Garden: why roses will not grow under oak trees (continued)

Item Number: S031441A

Student Responses (continued)

Incorrect Response:

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

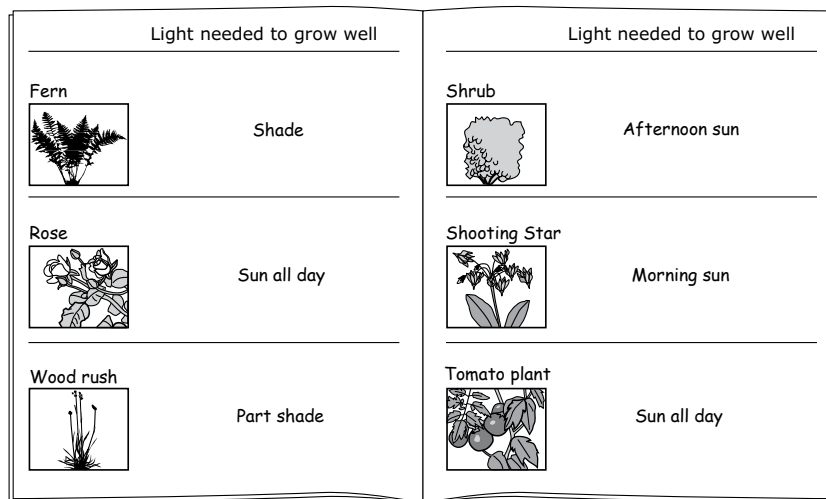
- A. Rebecca wanted to grow roses in Area 1 under the oak trees. Her friend Gwen disagreed and told her that the roses would **not** grow well in Area 1. Explain why Gwen says this.

She cannot grow them under the oak trees.

Content Domain	Main Topic	Cognitive Domain
LIFE SCIENCE	Ecosystems	Reasoning and Analysis

Garden: plants that grow well in four areas

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.



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.

Continued

Item Number: S031441B

Overall Percent Correct

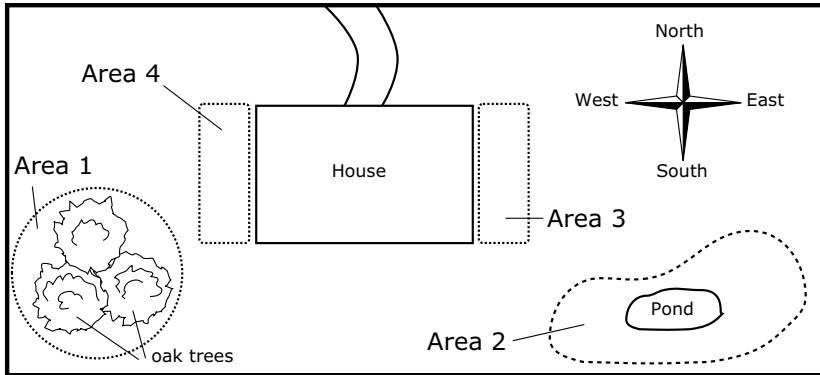
Japan	25	▲
Chinese Taipei	23	▲
United States	23	▲
Netherlands	22	▲
England	22	▲
Australia	20	▲
Hungary	20	▲
Russian Federation	20	▲
New Zealand	19	▲
Latvia	18	○
Singapore	18	▲
Belgium (Flemish)	18	▲
Hong Kong, SAR	15	○
Slovenia	14	○
International average	13	
Italy	12	○
Scotland	11	○
Lithuania	9	▼
Norway	7	▼
Moldova, Republic of	6	▼
Cyprus	4	▼
Armenia	2	▼
Iran, Islamic Republic of	2	▼
Morocco	2	▼
Tunisia	2	▼
Philippines	1	▼

Country average vs. International average:

Higher	▲
Not different	○
Lower	▼

Garden: plants that grow well in four areas (continued)

Item Number: S031441B



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	

Item Number: S031441B

Garden: plants that grow well in four areas (continued)

Item Number: S031441B

SCORING

Correct Response

- 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.]
- As above 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.]

Partial Response

- Identifies correct plants in at least one area but less than four areas.

Incorrect Response

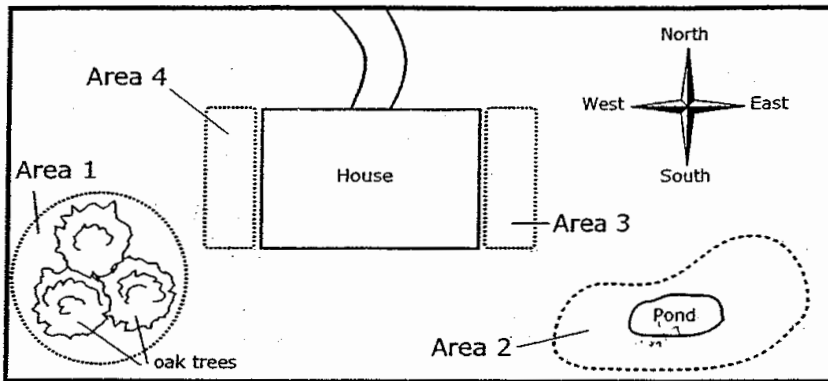
- Incorrect (including crossed out/erased, stray marks, illegible or off task)

Garden: plants that grow well in four areas (continued)

Item Number: S031441B

Student Responses

Correct Response:



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.

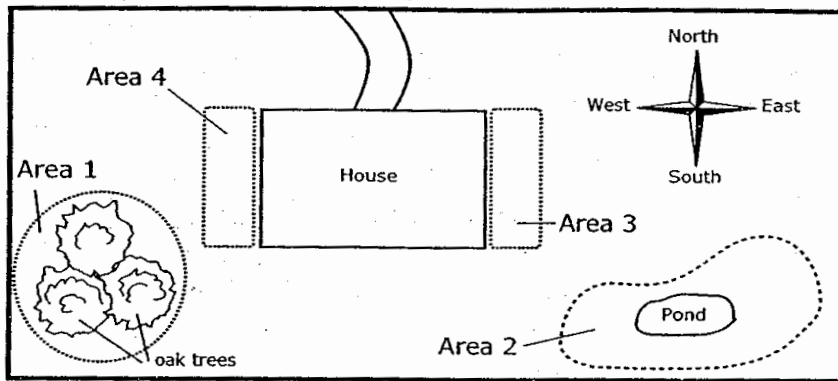
Area 1	Fern, wood rush
Area 2	Roses, tomato plant
Area 3	shooting star
Area 4	Shrub

Garden: plants that grow well in four areas (continued)

Item Number: S031441B

Student Responses (continued)

Partially Correct Response:



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.

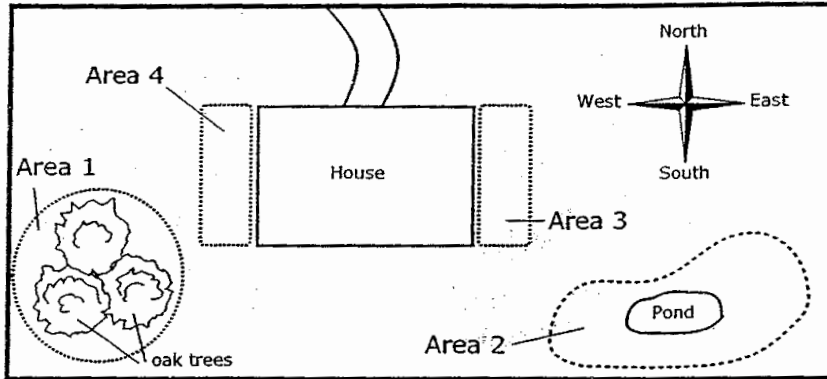
Area 1	wood rush and Scrub Fern
Area 2	Rose
Area 3	shooting star
Area 4	tomato plant

Garden: plants that grow well in four areas (continued)

Item Number: S031441B

Student Responses (continued)

Incorrect Response:



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.

[West]

Area 1	shooting stars would grow good there because they get sun in the morning. So when that light hits they'll grow good.
Area 2	shrub would grow good there because they get after noon sun which gives them light.
Area 3	The roses or tomato plants would grow there.
Area 4	I think the roses or tomato plants could also grow there.