Grade 5 Science Practice Test Answer Key

This document contains the answer keys, rubrics, and Scoring Notes for items on the Grade 5 Science Practice Test. Additional Practice Test resources are available in the LDOE Practice Test Library.

UPDATES INCLUDED - AUGUST 2021

- **Student Responses with Annotations -**
  Session 1 Item 8 (CR)
  Session 1 Item 12 (CR)
  Session 3 Item 27 (CR)

Session	Set	Sequence	Item Type	Key	Point Value	Alignment
1	Rafflesia	1	TEI	See Rubric	2	PE: 5-LS2-1 SEP: 2. Developing and using models DCI: UE.LS2B.a CCC: Systems and System Models
1		2	MC	D	1	PE: 5-LS1-1 SEP: 1. Asking questions (for science) and defining problems (for engineering) DCI: UE.LS1C.b
1		3	TEI	See Rubric	1	PE: 5-LS2-1 DCI: UE.LS2A.a CCC: Energy and Matter
1		4	TPI: MC/ MC	C/D	2	PE: 5-LS2-1 DCI: UE.LS2A.d CCC: Systems and System Models
1	Mixing Liquids	5	TEI	See Rubric	1	PE: 5-PS1-2 SEP: 5. Using mathematics and computational thinking DCI: UE.PS1B.b
1		6	TEI	See Rubric	1	PE: 5-PS1-4 SEP: 3. Planning and carrying out investigations DCI: UE.PS1B.a
1		7	TPD: MC/ MC	C/A	2	PE: 5-PS1-4 DCI: UE.PS1B.a CCC: Cause and Effect
1		8	CR	See Rubric	2	PE: 5-PS1-2 *SEP: 3. Planning and carrying out investigations DCI: UE.PS1B.b **The primary SEP is not in the dimension associated with the primary PE. This SEP is from bundled PE 5-PS1-4.*
1	Controlling Runoff	9	TEI	See Rubric	2	PE: 5-ESS2-1 DCI: UE.ESS2A.b CCC: Systems and System Models
1		10	MC	C	1	PE: 5-ESS3-1 SEP: 6. Constructing explanations (for science) and designing solutions (for engineering) DCI: UE.ESS3C.a

Session	Set	Sequence	Item Type	Key	Point Value	Alignment
1	Controlling Runoff	11	TEI	See Rubric	1	PE: 5-ESS3-1 SEP: 6. Constructing explanations (for science) and designing solutions (for engineering) DCI: UE.ESS3C.a CCC: Systems and System Models
1		12	CR	See Rubric	2	PE: 5-ESS3-1 DCI: UE.ESS3C.a CCC: Systems and System Models
1	Standalone Items	13	MC	B	1	PE: 5-LS1-1 DCI: UE.LS1C.b CCC: Energy and Matter
1		14	TPD: MC/ MC	D/C	2	PE: 5-PS1-4 DCI: UE.PS1B.a CCC: Cause and Effect
1		15	TEI	See Rubric	2	PE: 5-LS2-1 DCI: UE.LS2B.a CCC: Systems and System Models
2	Brightness and Shadows	16	TPD: TEI/ MC	See Rubric/	2	PE: 5-ESS1-1 DCI: UE.ESS1A.a CCC: Scale, Proportion and Quantity
2		17	MC	B	1	PE: 5-ESS1-1 SEP: 7. Engaging in argument from evidence DCI: UE.ESS1A.a CCC: Scale, Proportion and Quantity
2		18	TEI	See Rubric	2	PE: 5-ESS1-2 SEP: 4. Analyzing and interpreting data DCI: UE.ESS1B.a CCC: Patterns
2		19	MC	C	1	PE: 5-ESS1-2 SEP: 4. Analyzing and interpreting data DCI: UE.ESS1B.a CCC: Patterns
2		20	ER	See Rubric	9	PE: 5-ESS1-1 SEP: 7. Engaging in argument from evidence DCI: UE.ESS1A.a CCC: Scale, Proportion and Quantity
2	Standalone Items	21	TEI	See Rubric	1	PE: 5-ESS1-2 SEP: 4. Analyzing and interpreting data DCI: UE.ESS1B.a CCC: Patterns
2		22	TPD: MC/ MC	C/D	2	PE: 5-PS1-2 SEP: 5. Using mathematics and computational thinking DCI: UE.PS1A.b CCC: Energy and Matter
2		23	TPI: MC/ MC	B/C	2	PE: 5-PS3-1 SEP: 2. Developing and using models DCI: UE.PS3D.b CCC: Energy and Matter

Session	Set	Sequence	Item Type	Key	Point Value	Alignment
3	Louisiana Black Bears	24	MS	B/D	1	PE: 5-ESS3-1 SEP: 6. Constructing explanations (for science) and designing solutions (for engineering) DCI: UE.ESS3C.a
3		25	TEI	See Rubric	2	PE: 5-ESS3-1 SEP: 6. Constructing explanations (for science) and designing solutions (for engineering) DCI: UE.ESS3C.a CCC: Systems and System Models
3		26	MC	B	1	PE: 5-ESS3-1 SEP: 6. Constructing explanations (for science) and designing solutions (for engineering) DCI: UE.ESS3C.a
3		27	CR	See Rubric	2	PE: 5-ESS3-1 SEP: 6. Constructing explanations (for science) and designing solutions (for engineering) DCI: UE.ESS3C.a CCC: Systems and System Models
3	Mineral Identification	28	MC	B	1	PE: 5-PS1-3 SEP: 3. Planning and carrying out investigations DCI: UE.PS1A.c
3		29	TEI	See Rubric	2	PE: 5-PS1-3 SEP: 3. Planning and carrying out investigations DCI: UE.PS1A.c
3		30	MC	B	1	PE: 5-PS1-1 SEP: 3. Planning and carrying out investigations DCI: UE.PS1A.a CCC: Scale, Proportion and Quantity
3		31	TEI	See Rubric	2	PE: 5-PS1-1 DCI: UE.PS1A.c CCC: Scale, Proportion and Quantity
3	Standalone Items	32	MC	A	1	PE: 5-PS1-2 SEP: 5. Using mathematics and computational thinking DCI: UE.PS1A.b CCC: Energy and Matter
3		33	MC	D	1	PE: 5-LS1-1 SEP: 1. Asking questions (for science) and defining problems (for engineering) DCI: UE.LS1C.b
3		34	MC	C	1	PE: 5-ESS2-2 SEP: 5. Using mathematics and computational thinking CCC: Scale, Proportion and Quantity
3		35	MS	B/C	1	PE: 5-PS1-1 SEP: 2. Developing and using models DCI: UE.PS1A.a
3		36	MC	D	1	PE: 5-ESS1-2 SEP: 4. Analyzing and interpreting data DCI: UE.ESS1B.a

Session	Set	Sequence	Item Type	Key	Point Value	Alignment
3	Standalone Items	37	MC	B	1	PE: 5-ESS1-1 SEP: 7. Engaging in argument from evidence DCI: UE.ESS1A.a CCC: Scale, Proportion and Quantity
3		38	MC	C	1	PE: 5-PS3-1 SEP: 2. Developing and using models DCI: UE.PS3D.b CCC: Energy and Matter
3		39	MC	A	1	PE: 5-ESS2-2 SEP: 5. Using mathematics and computational thinking DCI: UE.ESS2C.a
3		40	TPD: MC/ MC	D/C	2	PE: 5-PS2-1 SEP: 7. Engaging in argument from evidence DCI: UE.PS2B.c CCC: Cause and Effect
3		41	TPD: TEI/ TEI	See Rubric	2	PE: 5-PS1-3 SEP: 3. Planning and carrying out investigations DCI: UE.PS1A.c

Item Types and Scoring:

- Multiple-choice (MC) questions with four answer options and only one correct answer. All MC items are worth one point each.

  Multiple-select (MS) questions with five to six answer options and more than one correct answer. For MS items, the question identifies the number of correct answers. All MS items are worth one point each.

- Technology Enhanced Items (TEI): uses technology to capture student comprehension in authentic ways, previously difficult to score by machine for large-scale assessments. TE items are worth up to two points and may include item types such as, but not limited to, drag and drop, dropdown menus, and hot spots.

- Two-part Items: require students to answer two related questions, worth a total of two points. Two-part items may combine MC, MS, and/or TE item types.
  - Two-part Dependent (TPD): the first part must be correct in order to earn credit for the second part. TPDs are scored as follows:
    - If both parts are correct, score is 2.
    - If Part A is correct and Part B is incorrect or partially correct, score is 1.
    - If Part A is incorrect, score is 0 regardless of Part B.
  - Two-part Independent (TPI): each part is scored independently, with each part worth one point.

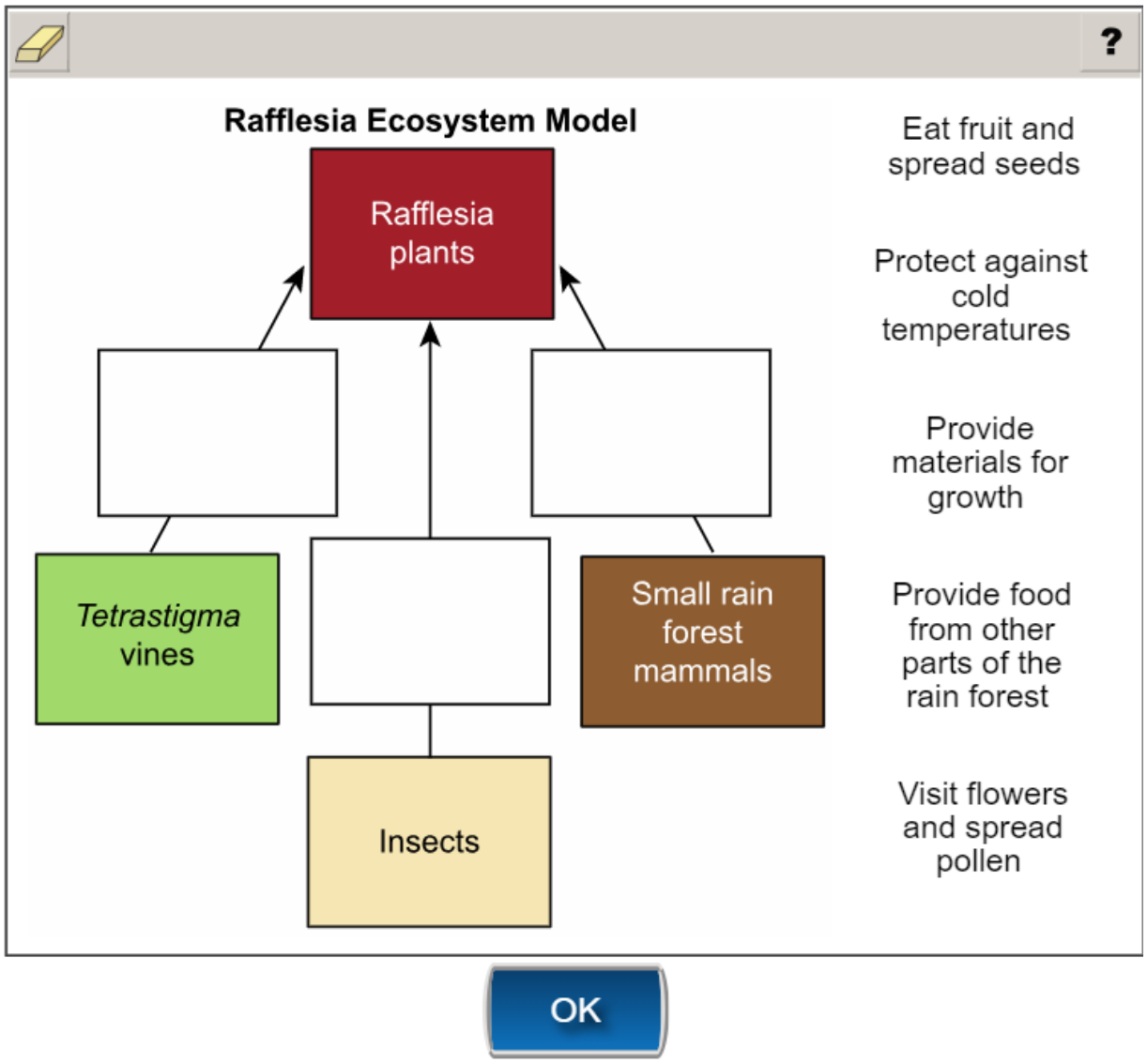
- Constructed Response (CR): requires a brief response provided by the student and will be scored using a 2-point rubric. These items may require a brief paragraph, a few sentences, and/or completion of a chart.

- Extended Response (ER): asks students to write an in-depth response that expresses the students' ability to apply all three dimensions of the LSS for Science and will be scored using a 9-point rubric.

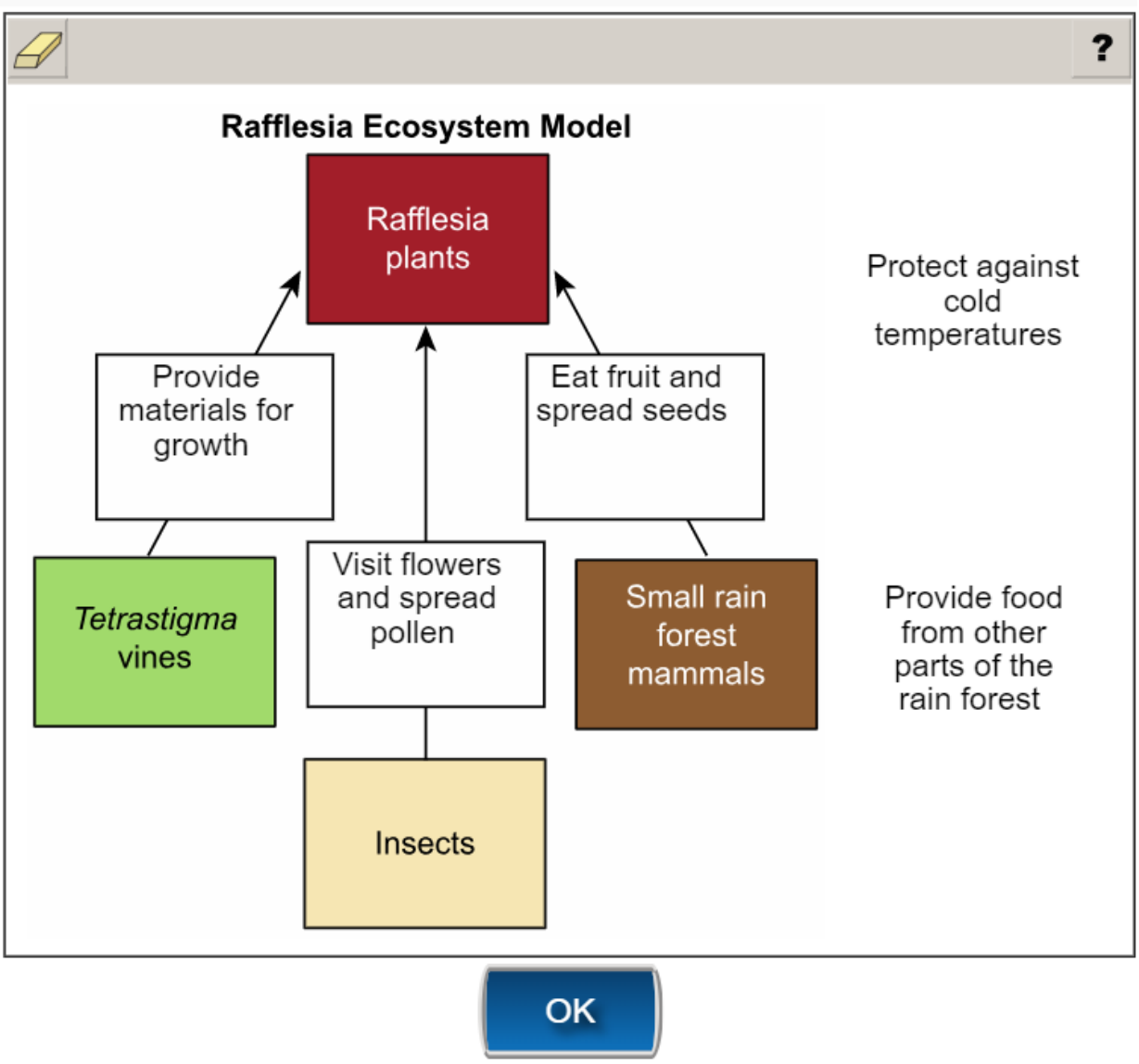
Session 1 Item 1 (TEI)

Rafflesia plants depend on *Tetrastigma* vines, insects, and small rain forest mammals so that they can grow and reproduce.

Drag the answer choice that **best** describes how each plant or animal helps rafflesia into the correct box. Not all answer choices will be used.



Session 1 Item 1 (TEI) - Rubric



Scoring Notes:

This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 3 correct responses; therefore 1 point will be awarded if the student selects 2 correct responses.

Session 1 Item 3 (TEI) - Rubric

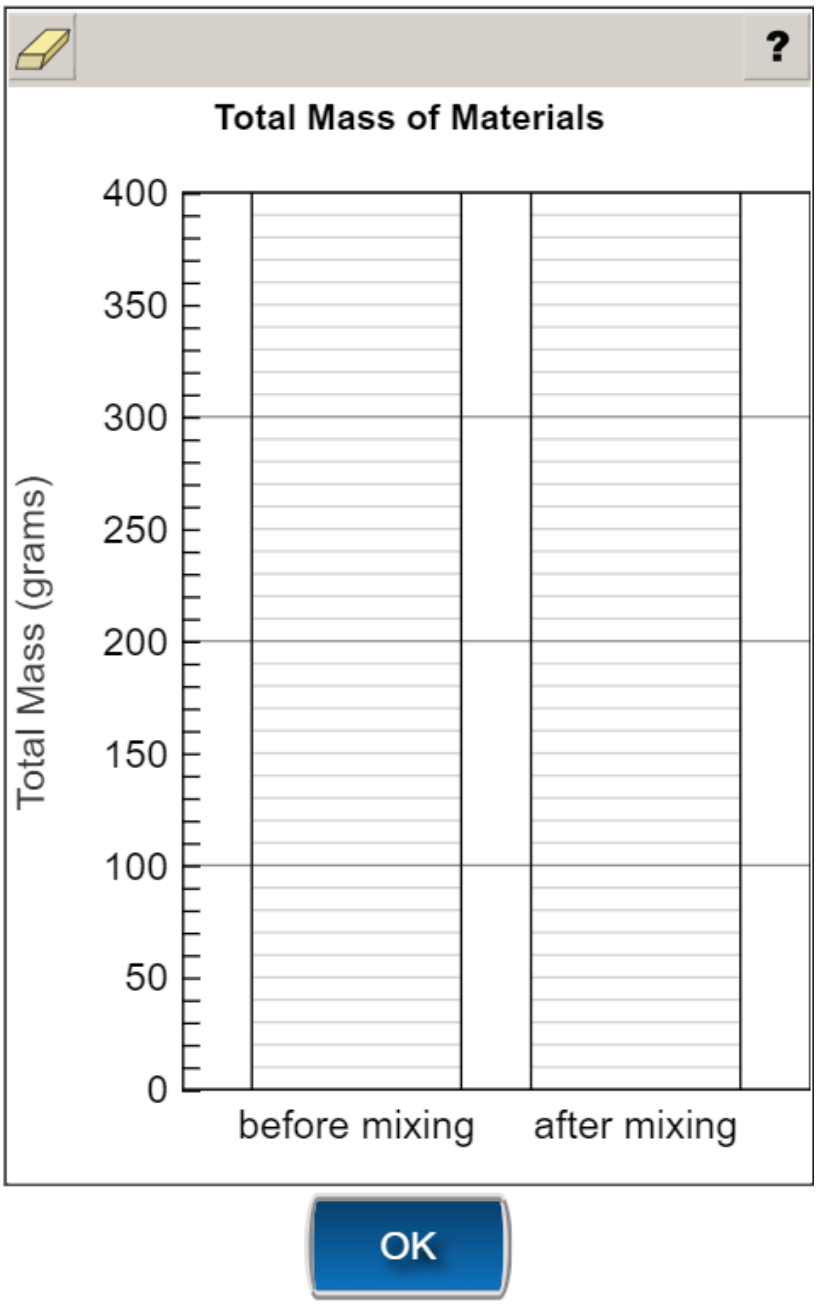
Matter transfers through a rafflesia food web. This food web helps other organisms obtain the nutrients they need in order to grow.

Select the correct answer from **each** drop-down menu to complete the sentence about where these nutrients come from.

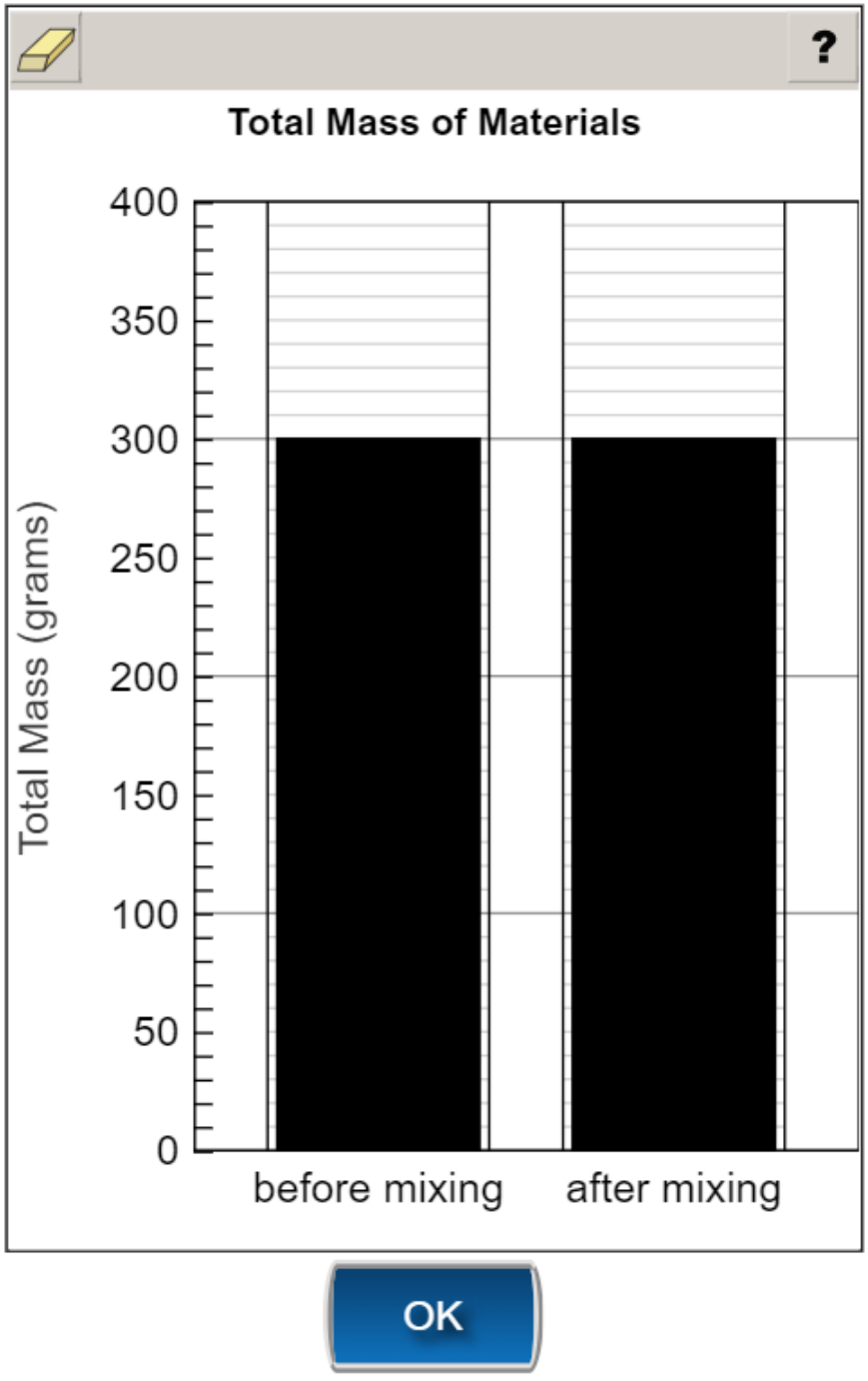
The nutrients in a rafflesia food web that small rain forest mammals need in order to grow come from [Tetrastigma vines ▼] because this part of the food web provides [matter to rafflesia plants ▼].

Session 1 Item 5 (TEI)

Predict the mass of the materials after the liquids are mixed. Drag the bars to the correct heights to show the mass of the materials before mixing and the predicted mass of the materials after mixing.



Session 1 Item 5 (TEI) - Rubric

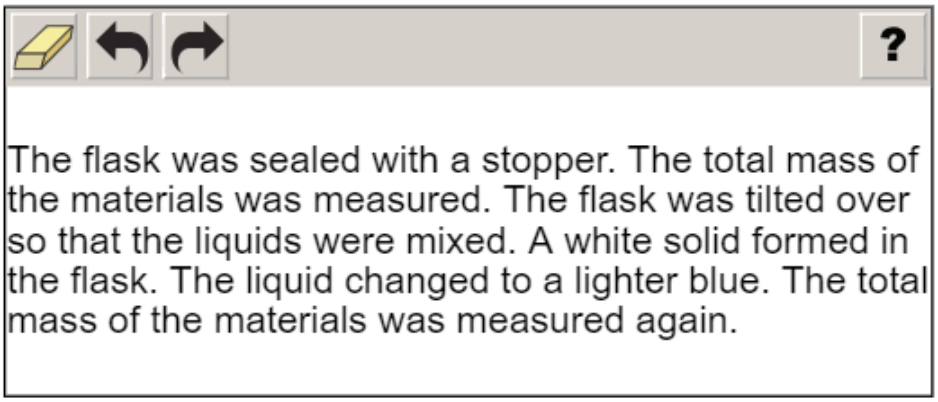


**NOTE: In the Accommodated Form, this item was changed to an MC. In the MC version in the paper form, the correct answer is "A."*

Session 1 Item 6 (TEI)

A student recorded some observations after watching the experiment in the video.

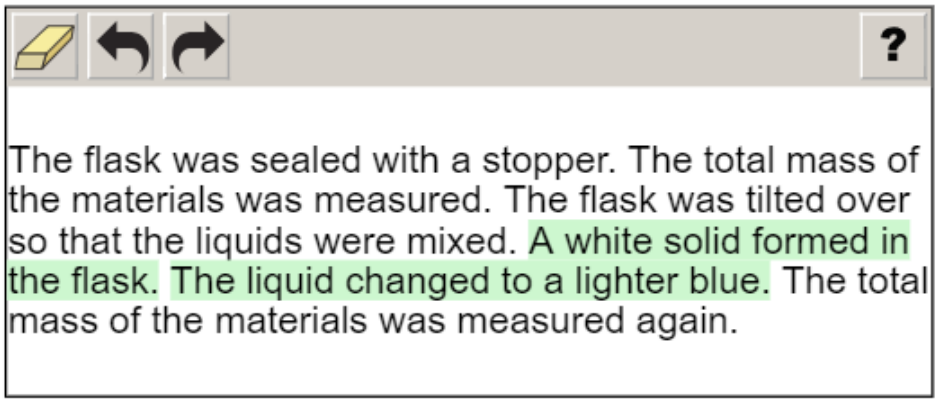
Select the **two** statements that provide evidence that mixing the two liquids produced new substances.



Session 1 Item 6 (TEI) - Rubric

A student recorded some observations after watching the experiment in the video.

Select the **two** statements that provide evidence that mixing the two liquids produced new substances.



Session 1 Item 8 (CR)

Use the information in Figure 2 to answer the question.

Explain why the scientist put a stopper on the flask and measured the total mass of the materials before and after mixing the solutions.

Scoring Information	
Score	**Description**
2	Student's response correctly explains why the scientist put a stopper on the flask AND explains why the scientist measured the mass before and after the experiment.
1	Student's response correctly explains why the scientist put a stopper on the flask OR explains why the scientist measured the mass before and after the experiment.
0	Student's response does not correctly explain why the scientist put a stopper on the flask OR why the scientist measured the mass before and after the experiment. **OR** Student's response is blank, irrelevant, or too brief to evaluate.

Scoring Notes:

- Explanation of why the scientist put a stopper on the flask (1 point)
- Explanation of why the scientist measured the mass before and after the experiment (1 point)

Examples include:

- The scientist put a stopper on the flask to be sure all the materials would stay inside the flask during the experiment, even if a gas was formed. The scientist measured the mass before and after the experiment so that the mass of the original materials could be compared with the mass of the materials that were produced.
- Putting a stopper on the flask keeps all of the materials inside the flask during the experiment. The scientist measured the mass before and after the experiment to determine if there was a change in mass during the reaction.

Accept other reasonable answers.

Student Responses for Session 1 Item 8 (CR)

Use the information in Figure 2 to answer the question.

Explain why the scientist put a stopper on the flask and measured the total mass of the materials before and after mixing the solutions.

Response 1

The scientist put a stopper on the flask because when the scientist flip it over the liquids will not fall out of the flask. The scientist measured the total mass of the materials before and after because she or he wanted to now if the mass was gone to change.

Score: 2
This response earns a 2. It correctly explains why the scientist put a stopper on the flask, “because when the scientist flip it over the liquids will not fall out of the flask.” The response also accurately explains why the scientist measured the mass before and after the experiment, “because she or he wanted to now if the mass was gone to change.”

Response 2

The scientist put a stoper so the gas wouldnt leave the bottle and so it would not change becuause he wanted to see if the mass would change when they measured the mass before and after mixing the solutions.

Score: 2
This response earns a 2. It correctly explains why the scientist put a stopper on the flask, “so the gas wouldnt leave the bottle.” The response also accurately explains why the scientist measured the mass before and after the experiment, “becuause he wanted to see if the mass would change.”

Response 3

For the mixing for nothing can come out of it and is not safe to be around flask and that why the scientist put a stopper on it.

Score: 1
This response earns a 1. It correctly explains why the scientist put a stopper on the flask, “For the mixing for nothing can come out of it.” The response does not provide an explanation why the scientist measured the mass before and after the experiment.

Response 4

The scienctist put a stopper in the flask and measured the total mass of the materials before and after mixing the soutions. The scienctist did that so they could know the mass of the materials before and after mixing the materials.

Score: 1

This response earns a 1. It does not provide an explanation why the scientist put a stopper on the flask. The response does accurately explain why the scientist measured the mass before and after the experiment, “so they could know the mass of the materials before and after mixing the materials.”

Response 5

I believe the reason why the scientest put the stopper on the flask and measured the total mass of the materials before and after mixing the solutions was because he/she wanted to see the the properties changed or if a chemical change happened.

Score: 0

This response earns a 0. It does not correctly explain why the scientist put a stopper on the flask nor does it accurately explain why the scientist measured the mass before and after the experiment, “because he/she wanted to see if a chemical change happened.” Evidence of a chemical change is seen without placing a stopper on the flask or measuring the mass of the materials.

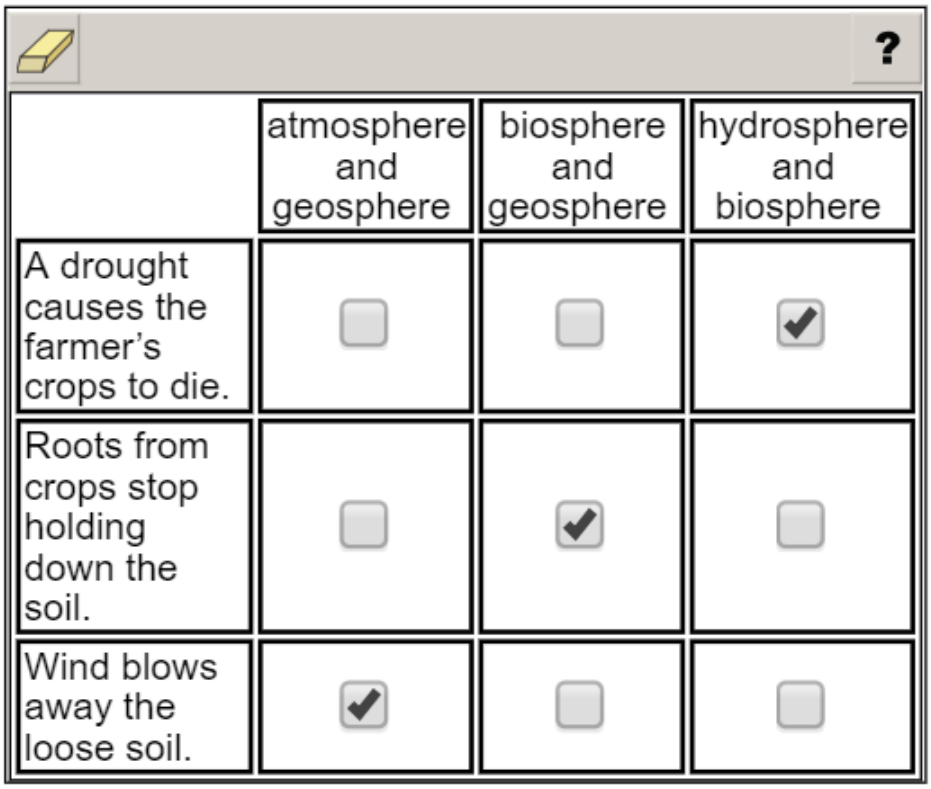
Session 1 Item 9 (TEI)

A farmer removes all the trees and native grasses from her land so that she can plant crops. A few years later, there is a serious drought, and the farmer observes a lot of dust in the air during the summer.

Identify the two systems that interact to cause **each** event.

	atmosphere and geosphere	biosphere and geosphere	hydrosphere and biosphere
A drought causes the farmer's crops to die.	☐	☐	☐
Roots from crops stop holding down the soil.	☐	☐	☐
Wind blows away the loose soil.	☐	☐	☐

Session 1 Item 9 (TEI) - Rubric



	atmosphere and geosphere	biosphere and geosphere	hydrosphere and biosphere
A drought causes the farmer's crops to die.	☐	☐	☑
Roots from crops stop holding down the soil.	☐	☑	☐
Wind blows away the loose soil.	☑	☐	☐

Scoring Notes:

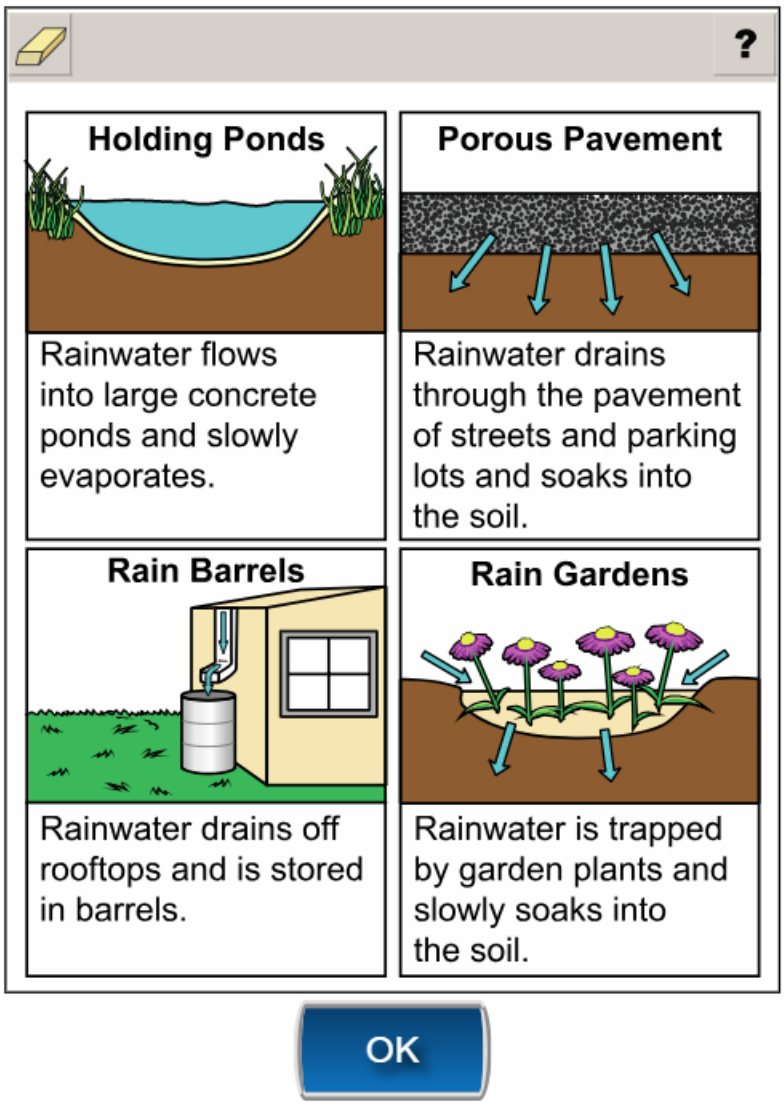
This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 3 correct responses; therefore 1 point will be awarded if the student selects 2 correct responses.

Session 1 Item 11 (TEI)

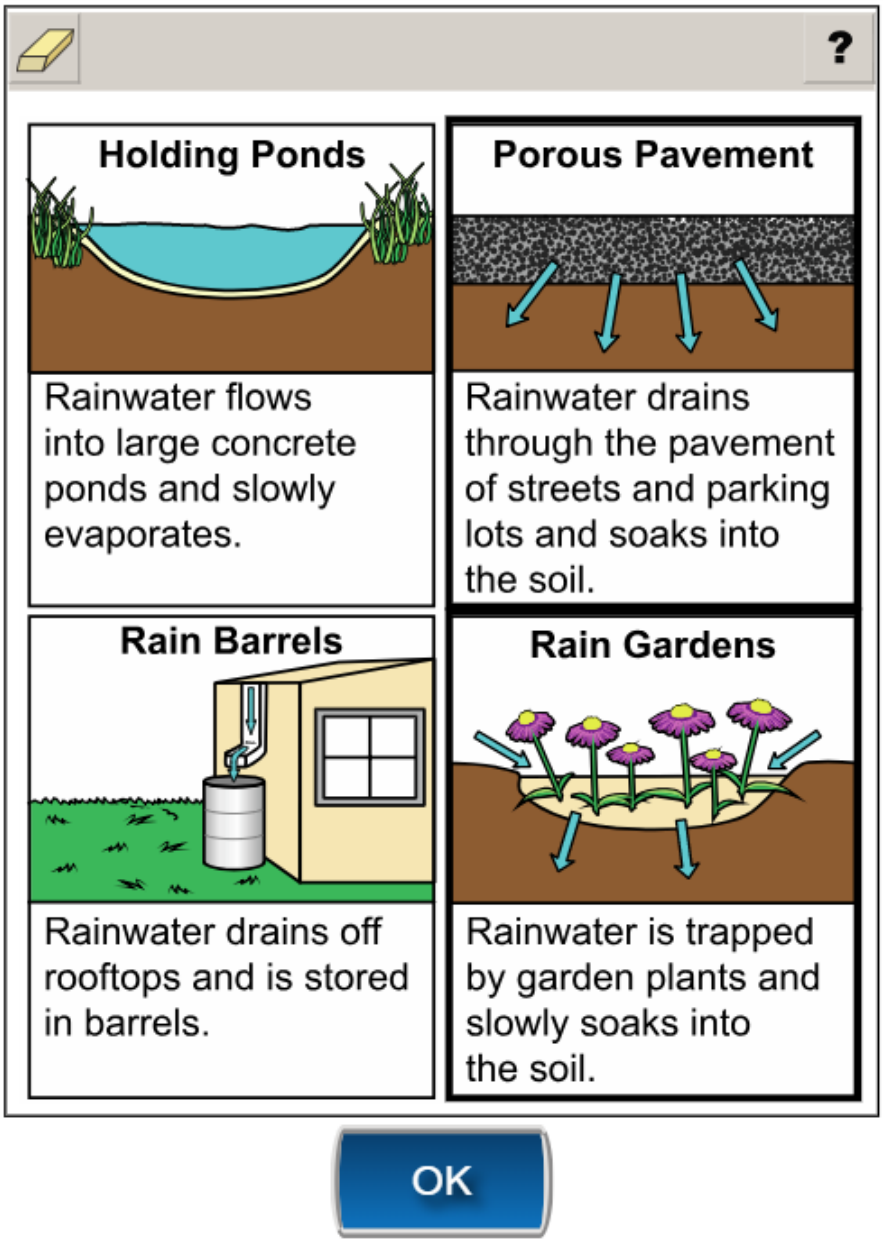
A city neighborhood has many apartment buildings and very little open land. The neighborhood is evaluating four methods to protect local water resources.

Which methods would **best** help people in a city neighborhood filter runoff before it enters local streams?

Select the **two** correct answers.



Session 1 Item 11 (TEI) - Rubric



Session 1 Item 12 (CR)

Use the information in Figure 2 to answer the question.

Marcia lives in Shreveport, Louisiana, which is almost 200 miles from the ocean. She is concerned that trash from her city may end up in rivers and streams and eventually pollute the ocean.

Explain how trash from Shreveport might end up in rivers and streams and ultimately the ocean. Suggest at least one way trash from Shreveport could be stopped from entering the ocean.

Scoring Information	
Score	**Description**
2	Student's response correctly explains how trash is transported from Shreveport to the ocean AND suggests a reasonable method to prevent trash from being transported from Shreveport to the ocean.
1	Student's response correctly explains how trash is transported from Shreveport to the ocean OR suggests a reasonable method to prevent trash from being transported from Shreveport to the ocean.
0	Student's response does **not** correctly explain how trash is transported from Shreveport to the ocean or suggest a reasonable method to prevent trash from being transported from Shreveport to the ocean. **OR** Student's response is blank, irrelevant, or too brief to evaluate.

Scoring Notes:

- Explanation of how trash is transported from Shreveport to the ocean (1 point)
- Suggestion of a method to prevent trash from being transported from Shreveport to the ocean (1 point)

Examples include:

- The trash washes into a street gutter, goes down into the storm sewer, and travels to the river, and the river empties into the ocean. People in Shreveport could put nets or screens across the sewer to catch trash before it reaches the river.
- The trash is washed into a street gutter and then into a river. The river carries the trash to the ocean. People in Shreveport could put more trash cans in public places so there will be less trash on the ground that can be washed into the street gutters.

Accept other reasonable answers.

Student Responses for Session 1 Item 12 (CR)

Use the information in Figure 2 to answer the question.

Marcia lives in Shreveport, Louisiana, which is almost 200 miles from the ocean. She is concerned that trash from her city may end up in rivers and streams and eventually pollute the ocean.

Explain how trash from Shreveport might end up in rivers and streams and ultimately the ocean. Suggest at least one way trash from Shreveport could be stopped from entering the ocean.

Response 1

One way that trash from Shreveport may end up in the ocean is from the runoofs of roads. Sometimes if you drive around you see a lot of trash on the ground because of littering, now when the runoff of the roads come in and pick up all the trash. Then it will lead to a drain that goes, to a river. Eventaully that river will reach the ocean. A way to stop that from happening is by picking up the trash in the road or telling people not throw trash in the road.

Score: 2

This response earns a 2. It correctly explains how trash is transported from Shreveport to the ocean, “when the runoff of the roads come in and pick up all the trash. Then it will lead to a drain that goes, to a river. Eventaully that river will reach the ocean.” The response also accurately suggests a reasonable method to prevent trash from being transported from Shreveport to the ocean, “by picking up the trash in the road.”

Response 2

the reason the trash from shreveport will end up in lakes rivers and ocean is because the way people treat the environment trash will go in the drains and go to the sewers. The trash and the runoff will then enter the river which then enters the ocean wich will lead to the extinction to oceanlife because the trash will have bad chemicals in it and ocean animals breath it so they will breath in the bad chemicals.

Score: 1

This response earns a 1. It correctly explains how trash is transported from Shreveport to the ocean, “the trash will go to the streams then pass in the rivers and then the ocean trash will go in the drains and go to the sewers. The trash and the runoff will then enter the river which then enters the ocean.” The response does not suggest a reasonable method to prevent trash from being transported from Shreveport to the ocean.

Response 3

If people from shreveport keep not picking up there pollution someday that might cause the ocean to be pooluted and dry up. People could build trash cans so it wont get polluted.

Score: 1

This response earns a 1. It does not explain how trash is transported from Shreveport to the ocean, “If people from shreveport keep not picking up there pollution someday that might cause the ocean to be pooluted and dry up.” The response accurately suggests a reasonable method to prevent trash from being transported from Shreveport to the ocean, “People could build trash cans.”

Response 4

Trash from Shreveport can end up in the river if people keep littering. They can clean the water and then put it in the water.

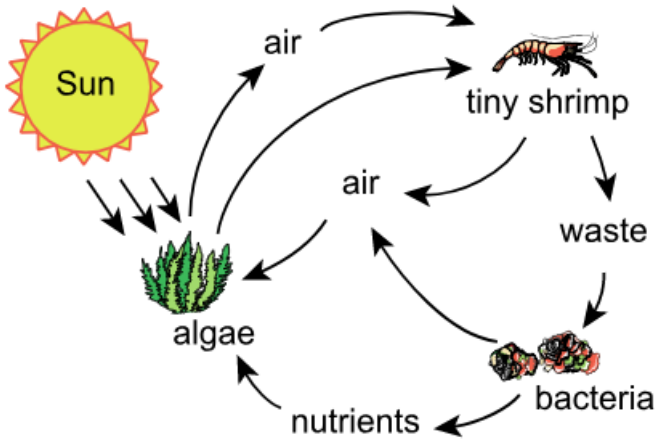
Score: 0

This response earns a 0. It does not explain how trash is transported from Shreveport to the ocean, “Trash from Shreveport can end up in the river if people keep littering”. The response also does not suggest a reasonable method to prevent trash from being transported from Shreveport to the ocean, “They can clean the water and then put it in the water.”

Session 1 Item 15 (TEI)

Use the information and your knowledge of science to answer the question.

Sam is developing a model of a simple aquatic ecosystem. Her model is shown in the figure.



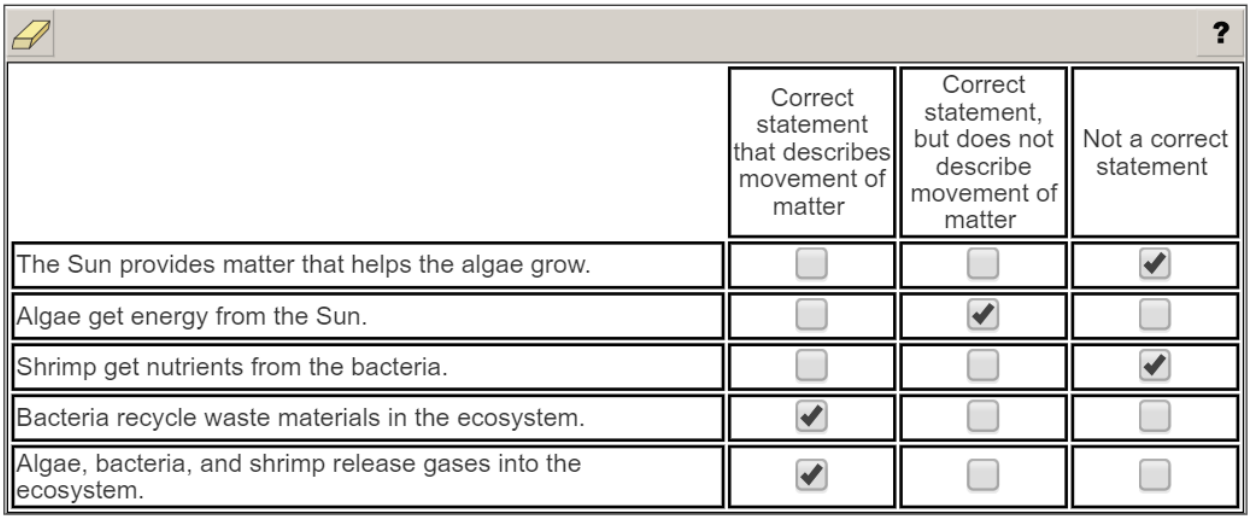
Sam wants to add labels to the model to explain how matter moves through the ecosystem. She writes a list of statements about the ecosystem.

Classify each statement. Select the correct boxes.

	Correct statement that describes movement of matter	Correct statement, but does not describe movement of matter	Not a correct statement
The Sun provides matter that helps the algae grow.	☐	☐	☐
Algae get energy from the Sun.	☐	☐	☐
Shrimp get nutrients from the bacteria.	☐	☐	☐
Bacteria recycle waste materials in the ecosystem.	☐	☐	☐
Algae, bacteria, and shrimp release gases into the ecosystem.	☐	☐	☐

OK

Session 1 Item 15 (TEI) - Rubric



	Correct statement that describes movement of matter	Correct statement, but does not describe movement of matter	Not a correct statement
The Sun provides matter that helps the algae grow.	☐	☐	☑
Algae get energy from the Sun.	☐	☑	☐
Shrimp get nutrients from the bacteria.	☐	☐	☑
Bacteria recycle waste materials in the ecosystem.	☑	☐	☐
Algae, bacteria, and shrimp release gases into the ecosystem.	☑	☐	☐

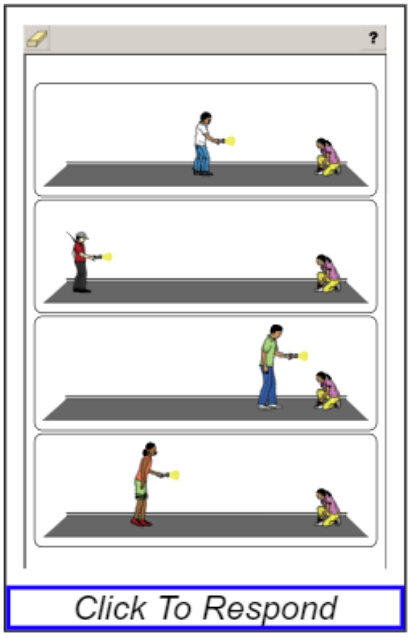
Scoring Notes:

This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 5 correct responses; therefore 1 point will be awarded if the student selects 3 or more correct responses.

Session 2 Item 16 (TPD)

The teacher has the students stand in a dark hallway with flashlights. Everyone has the same kind of flashlight. One student stops to tie her shoelace. When she looks up, each of her classmates is at a different distance away.

Drag the images in order so that the top image shows the flashlight that appears brightest and the bottom image shows the one that appears dimmest.



Part B

Which claim **best** supports the answer to Part A?

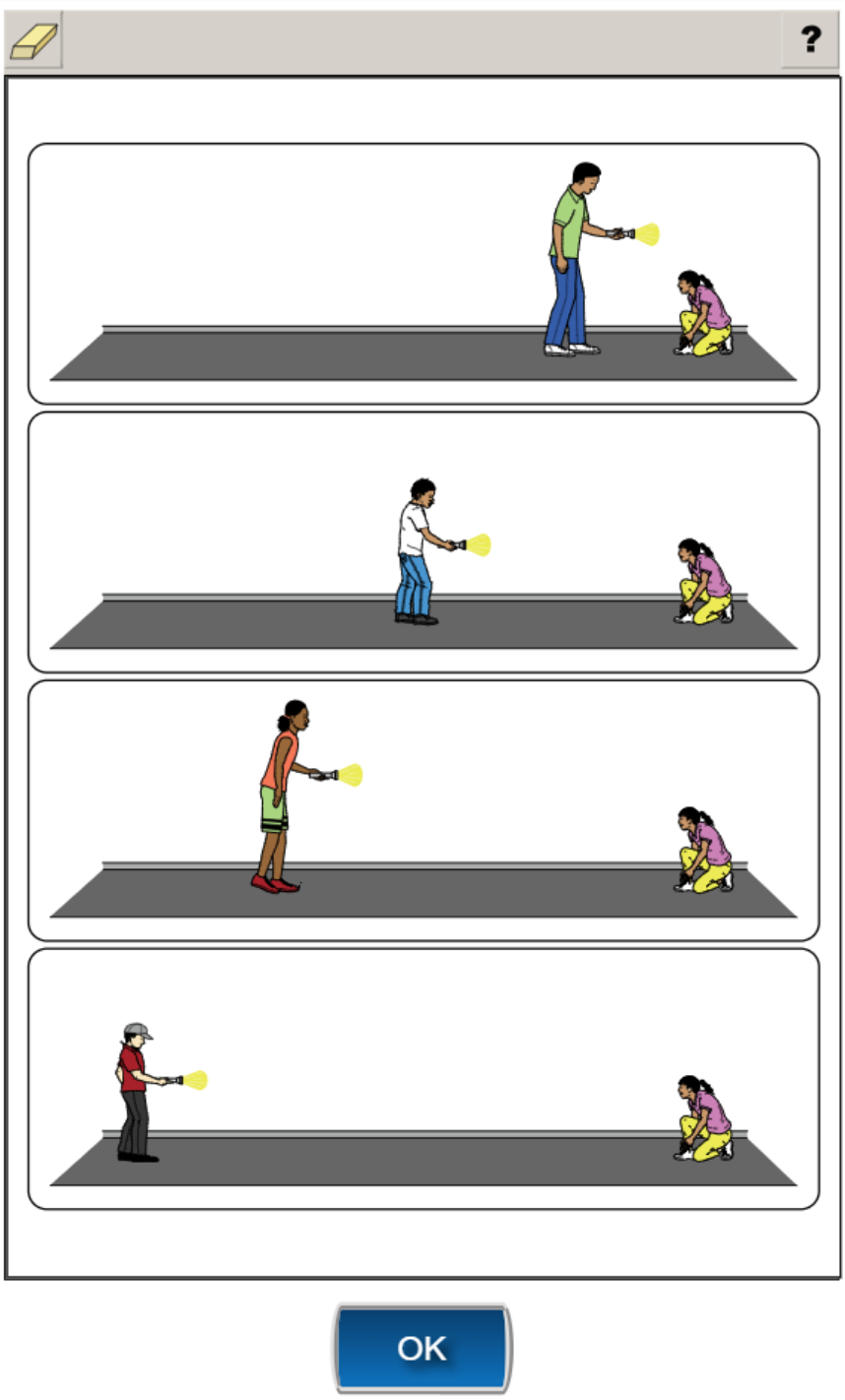
A. The light is brighter when taller people hold the flashlight because the light reflects off the walls and into the student's eyes.

B. The light is brighter when the flashlight is closer because the light is more focused.

C. The light is brighter when the flashlight is farther away because the light can spread out.

D. The light is brighter when shorter people hold the flashlight because the light reflects off the student's clothes and into the student's eyes.

Session 2 Item 16 (TPD) - Rubric



NOTE: In Accommodated Form, student will write label of Pictures in order: Picture 3, Picture 1, Picture 4, Picture 2.

Session 2 Item 16 (TPD)- Rubric, continued

Part B

Which claim **best** supports the answer to Part A?

(a) The light is brighter when taller people hold the flashlight because the light reflects off the walls and into the student's eyes.

(b) The light is brighter when the flashlight is closer because the light is more focused.

(c) The light is brighter when the flashlight is farther away because the light can spread out.

(d) The light is brighter when shorter people hold the flashlight because the light reflects off the student's clothes and into the student's eyes.

Session 2 Item 18 (TEI) - Rubric

Use the information in Figure 2 to answer the question.

Students observe that their shadows change appearance during the day.

Select the correct answer from **each** drop-down menu to complete the sentences.

At noon, the students observe that their shadows are [short ▼] because the sunlight is coming from [overhead ▼].

Later, when the students walk home at 3 P.M., their shadows are [longer ▼] because the sunlight is coming from [between the horizon and overhead ▼].

Scoring Notes:

This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 4 correct responses; therefore 1 point will be awarded if the student selects 2 or more correct responses.

Session 2 Item 20 (ER)

Use the information in Figure 1 and Figure 2 to answer the questions.

Part A

Karen notices that she can see the North Star at night, but she cannot see this star during the day.

Explain why Karen can see the North Star only at night. Use evidence from Figure 1 to support your explanation.

Part B

Karen asks her cousins in different cities to help her with an investigation. They all observe the angle of the Sun and the shadow of a meterstick when it is noon in Karen's city. They make these observations:

- Karen sees that the Sun is shining directly overhead.
- Nancy sees that the Sun is shining at a small angle.
- Sheila sees that the Sun is shining at a large angle.
- Taylor sees that the Sun is shining at a small angle.

Predict how the length of the shadow Karen measures will compare with the length of the shadow each of her cousins measures. Use evidence from Figure 2 to support your answer.

Score Points

- The student's score is the sum total of all the points earned across all parts (up to an item-maximum of 9 points) of the item.
- The student's score is 0 if the response is blank, incorrect, or does not address the prompt.

Session 2 Item 20 (ER), continued

PART A (0-3 points maximum)

- 3 points for a prediction with explanation that uses evidence
  - Score 3 points: Correct explanation that uses distance between the stars and evidence from the model to support the answer

  OR

  - Score 2 points: Correct explanation that uses distance between the stars to support the answer, but does not use the model as evidence

  OR

  - Score 1 point: Correct explanation without reasoning or evidence

PART B (0-6 points maximum)

- 2 points for each comparison with evidence (for a total of THREE comparisons)
  - Score 2 points: Each correct comparison that uses evidence from the model to support the answer

  OR

  - Score 1 point: Each correct comparison without evidence to support the answer

Score Information

PART A: Student explains why the North Star cannot be seen during the day. (3 pts for a correct explanation with reasoning and evidence from the model; 2 pts for a correct explanation with reasoning, but no evidence from the model; 1 pt for a correct explanation without reasoning or evidence)

1. Explanation about why Karen cannot see the North Star during the day:

- The North Star is not as bright as the Sun, so the sunlight keeps Karen from seeing the North Star when the Sun is shining.

2. Reasoning to support the explanation:

- The North Star is much farther away from Earth than the Sun, so it is not as bright as the Sun.

Session 2 Item 20 (ER), continued

3. Evidence from the model to support the explanation:

- The model shows that closer lights appear brighter.

Part B: Student compares the lengths of shadows for a meterstick between Karen and her three cousins. (2 pts each with evidence from the model; 1 pt each without evidence)

1. Karen will measure a shorter shadow than Nancy:

- Karen's meterstick shadow will be very short, but Nancy's meterstick shadow will be a little longer.
- This is because the angle of the sunlight is at a small angle for Nancy, like in Trial 2 of the model, but directly overhead for Karen, like in Trial 1 of the model. The shadow in Trial 2 is longer than in Trial 1.

2. Karen will measure a shorter shadow than Sheila:

- Sheila's meterstick shadow will be long, but Karen's meterstick shadow will be very short.
- This is because the angle of the sunlight will be directly overhead for Karen, like in Trial 1 of the model, but a bigger angle for Sheila, like in Trial 3 of the model. The shadows in Trial 1 are shorter than in Trial 3.

3. Karen will measure a shorter shadow than Taylor:

- Karen's meterstick shadow will be very short, but Taylor's meterstick shadow will be a little longer.
- This is because the angle of the sunlight is at a small angle for Taylor, like in Trial 2 of the model, but directly overhead for Karen, like in Trial 1 of the model. The shadow in Trial 2 is longer than in Trial 1.

Student Responses for Session 2 Item 20

Part A

Karen notices that she can see the North Star at night, but she cannot see this star during the day.

Explain why Karen can see the North Star only at night. Use evidence from Figure 1 to support your explanation.

Response 1

Karen can only see the North Star at night because our Sun is so close and bright that it makes other stars dimmer. As well as the North star being so far away it's light would appear dimmer. The teacher when she is closest to the globe would be like the Sun and when she is the farthest would be the north star. Showing in relativity the distance of the sun and the North star.

Score: 3

This response earns a 3. It fully and accurately explains why the North Star cannot be seen during the day, "our Sun is so close and bright that it makes other stars dimmer." The response provides reasoning that uses distance between the stars with evidence from the model to support the reasoning, "As well as the North star being so far away it's light would appear dimmer. The teacher when she is closest to the globe would be like the Sun and when she is farthest she would be the north star."

Response 2

The North Star will always be their, but it is so far away that you only see the little speck in the sky. If we were a the North Star or Sun would look the same way. We are so close to our Sun that when the Earth spins and the sun “rises” that it just out shines the North Star. But at night when the sun is not up we see the faint glow of the North Star because there is no brighter light in the sky. Also you can see that the North star changes position through out the night. The star is not moving we are so part of it is that we partly turn away from the star, and then the sun is there to out shine it.

Score: 2

This response earns a 2. It accurately explains why the North Star cannot be seen during the day, “at night when the sun is not up we see the faint glow of the North Star because there is no brighter light in the sky.” The response provides reasoning that uses distance between the stars but does not provide evidence from the model to support the reasoning, “The North Star will always be their, but it is so far away that you only see the little speck in the sky. We are so close to our Sun that when the Earth spins and the sun ‘rises’ that it just outshines the North Star.”

Response 3

Karen says that she can only see the North Star at night. This is because when the sun is up, the North Star is too dim to be seen. In the picture, when the teacher is close to the globe, the light is brighter. When the teacher backs up, the light is dimmer. This is like the sun. When the sun is close to our area, it is too bright to see the stars. When the sun is farther away from our area, it is darker and you can see the stars. This is because when the light is concentrated to one area, it is brighter. When it is focused in a different area, it is darker. When the sun is out, the stars are still there, just to dim to be visible. This is why she can see it only at night.

Score: 1

This response earns a 1. It accurately explains why the North Star cannot be seen during the day, “when the sun is out, the stars are still there, just to dim to be visible.” The response does not accurately provide reasoning that uses distance between the stars nor does it accurately provide evidence from the model to support the reasoning, “When the sun is close to our area, it is too bright to see the stars. When the sun is farther away from our area, it is darker and you can see the stars. In the picture, when the teacher is close to the globe, the light is brighter. When the teacher backs up, the light is dimmer. This is like the sun.” This reasoning and evidence suggests that the sun is moving closer and farther away from the Earth, which is inaccurate.

Response 4

Karen can only see this star at night because the earth rotates and at night the Earth is closer to the North Star and during the day the Earth is farther away from this star. So therefore it is harder to see the star in the day rather than at night.

Score: 0

This response earns a 0. It inaccurately explains why the North Star cannot be seen during the day, “at night the Earth is closer to the North Star and during the day the Earth is farther away from this star.” The response does not provide reasoning that uses distance between the stars, and therefore, does not receive credit for evidence from the model to support the reasoning.

Part B

Karen asks her cousins in different cities to help her with an investigation. They all observe the angle of the Sun and the shadow of a meterstick when it is noon in Karen's city. They make these observations:

- Karen sees that the Sun is shining directly overhead.
- Nancy sees that the Sun is shining at a small angle.
- Sheila sees that the Sun is shining at a large angle.
- Taylor sees that the Sun is shining at a small angle.

Predict how the length of the shadow Karen measures will compare with the length of the shadow each of her cousins measures. Use evidence from Figure 2 to support your answer.

Response 1

Karen's shadow will be really short. Nancy and Taylor's shadow will be short, but Sheila's shadow will be long. Karen's shadow is like position one/overhead. Nancy and Taylor's shadows will be like position two/angled, and Sheila's shadow will be like figure three/horizon.

Score: 6

This response earns a 6. It accurately compares the lengths of the shadows for a meterstick between Karen and her three cousins, "Karen's shadow will be really short. Nancy and Taylor's shadows will be short, but Sheila's shadow will be long." The response accurately provides evidence for each comparison from the model, "Karen's shadow is like position one/overhead. Nancy and Taylor's shadows will be like position two/angled, and Sheila's shadow will be like figure three/horizon."

Response 2

The Length of the shadow Karen measures would be short. The length of her cousins would be a little longer than her shadow. Her other cousin Sheila will be longer than both taylor and Karen. I know this because according ot figure two it shows and example of all three girls. Position 3 shows an example of what Karens meterstick would look like. And position 2 shows the length of what nancys would look like. Position 3 hows a shadow of what shalies shadow would look like. This tells me the comparisons of the cousins.

Score: 5

This response earns a 5. It accurately compares the lengths of the shadows for a meterstick between Karen and her three cousins, “The Length of the shadow Karen measures would be short. The length of her cousins would be a little longer than her shadow. Her other cousin Sheila will be longer than both taylor and Karen.” The response accurately provides evidence for Nancy’s and Sheila’s comparisons from the model, “And position 2 shows the length of what nancys would look like. Position 3 hows a shadow of what shalies shadow would look like.”

Response 3

Karen’s shadow will be right below her and small. Nancy’s shadow will be slightly longer than Karen’s. Sheila’s shadow will be way longer than all of the girls I know this because position 3 shows the light at a large angle and it longer than all of the other ones. Also Taylor’s shadow will be the same length of Nancy’s.

Score: 4

This response earns a 4. It accurately compares the lengths of the shadows for a meterstick between Karen and her three cousins, “Karen’s shadow will be right below her and small. Nancy’s shadow will be slightly longer than Karen’s. Sheila’s shadow will be way longer than all of the girls. Also Taylor’s shadow will be the same length of Nancy’s.” The response accurately provides evidence for one comparison from the model, “I know this because position 3 shows the light at a large angle and it longer than all of the other ones.”

Response 4

Karen's shadow would be shorter than her cousins since its shining directly over her head. It would be a small difference between hers and Nancy's because Nancy's is at a small angle. Between Sheila and Karen they would have a huge difference because Sheila's is at a large angle. Taylor and Karen would have a slight difference as well.

Score: 3

This response earns a 3. It accurately compares the lengths of the shadows for a meterstick between Karen and her three cousins, "Karen's shadow would be shorter than her cousins since it is shining directly over her head." The response does not provide evidence for the comparisons from the model. The response provides text given in the prompt (i.e. small angle, large angle) and does not address the length of the shadows in the model. The response shows no understanding of the model.

Response 5

Karen's shadow will compare to her cousins shadows because they go out to see the shadows at different times so the shadows will differ. Karens shadow will be very short. Nancy's shadow will be a little longer. Sheila's shadow will be the longest of them all.

Score: 2

This response earns a 2. It accurately compares the lengths of the shadows for a meterstick between Karen and two cousins, "Karens shadow will be very short. Nancy's shadow will be a little longer. Sheila's shadow will be the longest of the all." The response does not provide evidence for the comparisons from the model.

Response 6

Based on my knowledge on science and the information given I know that the length of Karen's measure will compare to her cousins measure because Karen's measure doesn't have a shadow while the cousin's measure had a short shadow. Sheila's see that the sun is shinning at a large angle which most likely has a longer shadow. According to Figure 1 it says, "She then moves the flashlight at an angle along the side of the block, as shown in Figure 2." This lets me know that all of their measures compare because each of the shadows are a little bit longer than the other.

Score: 1

This response earns a 1. It accurately compares the lengths of shadows for a meterstick between Karen and one cousin, "Karen's measure doesn't have a shadow. Sheila's sees that the sun is shinning at a large angle which most likely has a longer shadow." Although the response provides a comparison for another cousin, it does not state which one, "while the cousin's measure had a short shadow." The response does not fully provide evidence for the comparisons from the model, "each of the shadows are a little bit longer than the other."

Response 7

I predict that in Karen's observation, the shadow will be small. The shadow won't go to an angle or anything like in figure one. For Nancy's and Taylor's observation, I think the shadow will appear to be large and will go at an angle like in figure three. Then last of all Sheila's observation will appear to have a small shadow and will still go at an angle, but not very much like in figure two.

Score: 0

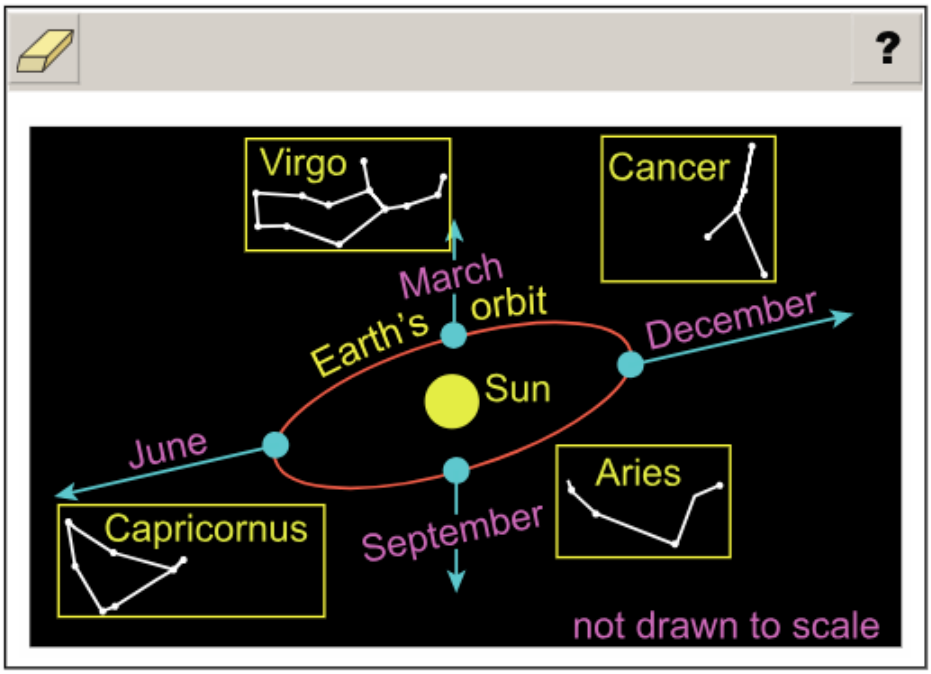
This response earns a 0. It does not accurately compare the lengths of shadows for a meterstick between Karen and her three cousins, nor does it provide accurate evidence for the comparisons from the model. The response only describes Karen's shadow and does not compare it to her cousins' shadows, "I predict that in Karen's observation, the shadow will be small. The shadow won't go to an angle or anything like in figure one."

Session 2 Item 21 (TEI)

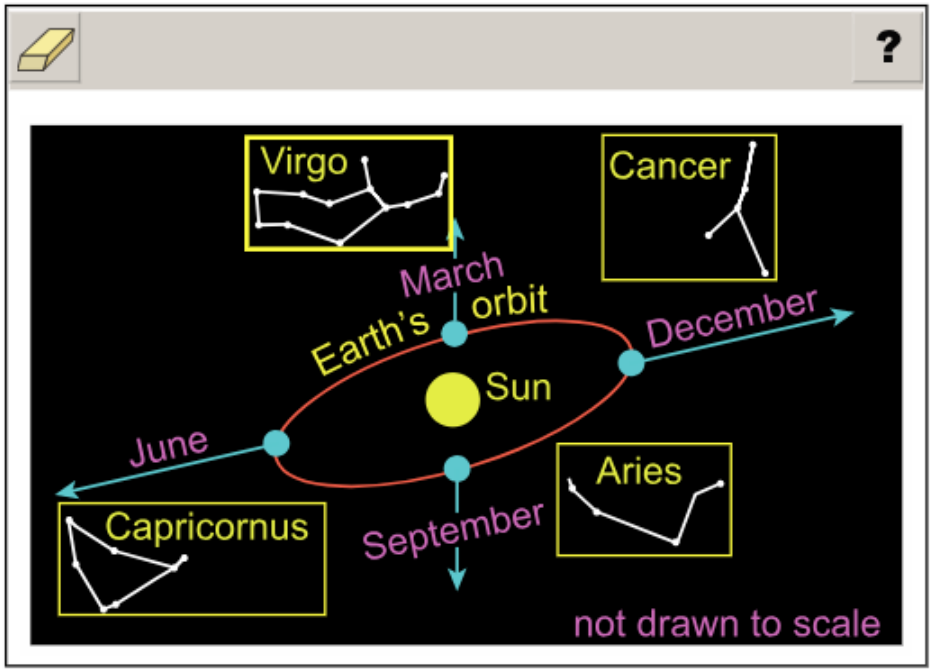
Use the information and your knowledge of science to answer the question.

Observers on Earth see different star constellations depending on the time of year. The arrows on the diagram point to the part of the sky that is visible overhead for observers on Earth at different times of the year.

Select the constellation on the star diagram that will **most likely** be visible in April.



Session 2 Item 21 (TEI) - Rubric



Session 3 Item 25 (TEI) - Rubric

Bears form a system with their habitats and other animals that live in their habitats.

Select the correct answer from **each** drop-down menu to complete the statements.

Building new cities requires removing the habitat that was already there. Since the trees and animals in the habitat are gone, bears will not be able to [find enough food ▾]. As a result, the bears must find new [food sources ▾]. This causes bears to interact with humans more often. This is dangerous for bears because bears might [be hit by cars ▾].

Scoring Notes:

This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 3 correct responses; therefore 1 point will be awarded if the student selects 2 correct responses.

Session 3 Item 27 (CR)

Select two parts of the plan described in the passage and explain how each part leads to an increase in the bear population.

Scoring Information	
Score	**Description**
2	Student's response correctly explains how two parts of the plan lead to an increase in the bear population.
1	Student's response correctly explains how one part of the plan leads to an increase in the bear population but not how a second part of the plan leads to an increase in the bear population.
0	Student's response does not explain how two parts of the plan lead to an increase in the bear population. **OR** Student's response is blank, irrelevant, or too brief to evaluate.

Scoring Notes:

- Explanation of how one part of the plan leads to an increase in the bear population (1 point)
- Explanation of how a second part of the plan leads to an increase in the bear population (1 point)

Examples include:

- Using education to reduce bear deaths on roads will help reduce bear deaths by getting hit by cars. If more bears survive, then there will be more bears to reproduce, so that the population will increase.
- Connecting areas where bears live so that they can travel farther will allow bears to find more food so that they can survive. If more bears survive and reproduce, the population will increase.

Accept other reasonable answers.

Student Responses for Session 3 Item 27 (CR)

Select two parts of the plan described in the passage and explain how each part leads to an increase in the bear population.

Response 1

Reducing the illegal killing of bears can help because more bears can reproduce more giving the population an increase. Increasing the bear habitat will help increase bear population by allowing bears to have more space to find food so they don't die.

Score: 2

This response earns a 2. It correctly explains how two parts of the plan lead to an increase in the bear population. The explanation of how one part of the plan leads to an increase in the bear population is, "Reducing the illegal killing of bears can help because more bears can reproduce more giving the population an increase." The explanation of how a second part of the plan leads to an increase in the bear population is, "Increasing the bear habitat will help increase bear population by allowing bears to have more space to find food so they don't die."

Response 2

One plan is, reduced illegal killing black bears. It will increase the population black bears because people wont be able to kill black bears any more so they could stay alive. The second plan is, connect areas where bears live because bears can mate with each other to reproduce and make more Louisiana black bears. That will increase the population if you let the bears mate and reproduce.

Score: 2

This response earns a 2. It correctly explains how two parts of the plan lead to an increase in the bear population. The explanation of how one part of the plan leads to an increase in the bear population is, "One plan is, reduced illegal killing black bears. It will increase the population black bears because people wont be able to kill black bears any more so they could stay alive." The explanation of how a second part of the plan leads to an increase in the bear population is, "The second plan is, connect areas where bears live because bears can mate with each other to reproduce and make more Louisiana black bears."

Response 3

The two parts in the passage that described how much each part lead to an increase in bear population is increasing the bear habitat so it can find more food and have more babys. And an other plan that will work is connect areas where bears live so that they can travel farther.

Score: 1

This response earns a 1. It correctly explains how one part of the plan leads to an increase in the bear population but not how a second part of the plan leads to an increase in the bear population. The explanation of how one part of the plan leads to an increase in the bear population is, “increasing the bear habitat so it can find more food and have more babys.” The second part of the plan is listed, “connect areas where bears live so that they can travel farther”, but no explanation of how the plan leads to an increase in the bear population is provided.

Response 4

1 Reason
From the passage, Move some bears to new areas within the state, so the can go to different spots so the can find food there and live.
2 Reason
From the passage,Connect areas where bears live so that they can travel farther to find mates, they going to have to find friends so they can connect with other people and learn how to not eat people who are going on travel so where.

Score: 1

This response earns a 1. It correctly explains how one part of the plan leads to an increase in the bear population but incorrectly explains how a second part of the plan leads to an increase in the bear population. The explanation of how one part of the plan leads to an increase in the bear population is, “Move some bears to new areas within the state, so the can go to different spots so the can find food there and live.” The explanation of how a second part of the plan leads to an increase in the bear population incorrectly states, “Connect areas where bears live so that they can travel farther, they going to have to find friends so they can connect with other people and learn how to not eat people who are going on travel.”

Response 5

One of the plans are to stop the humans from killing the bears and to make it illegal to kill bears and another plan is to use education to reduce ber deaths on roads.

Score: 0

This response earns a 0. It does not explain how two parts of the plan lead to an increase in the bear population. The response lists two parts of the plan described in the passage but does not provide an explanation for either part. The two parts listed are, “make it illegal to kill bears” and “use education to reduce ber deaths on roads.”

Session 3 Item 29 (TEI)

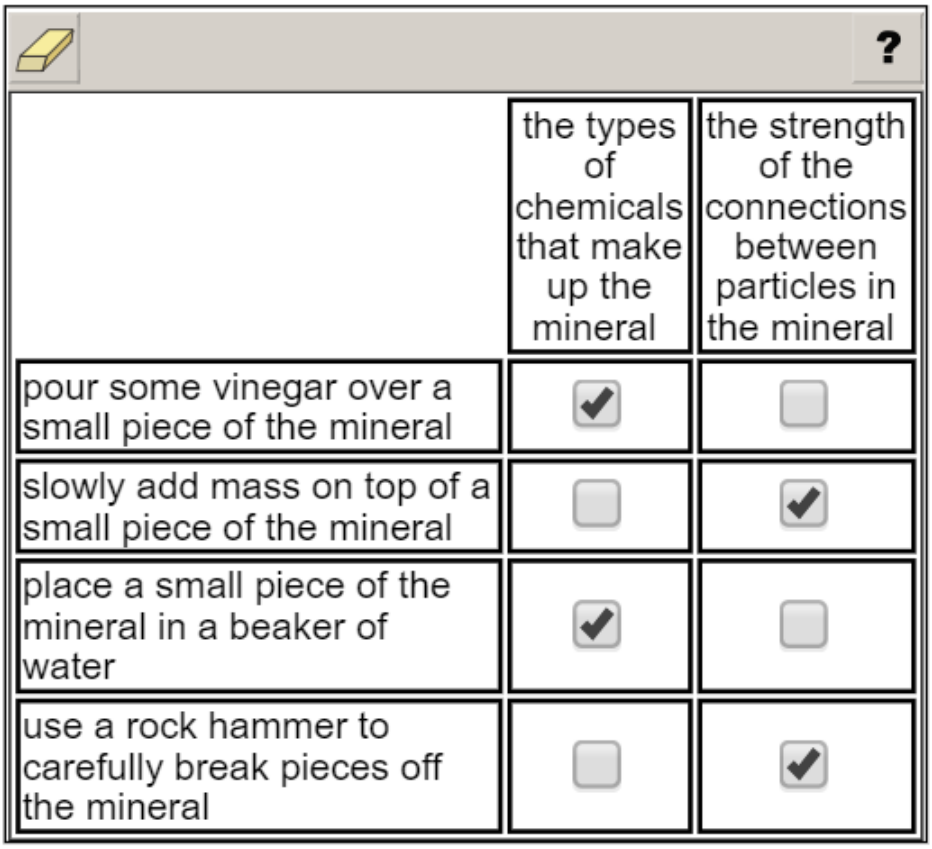
Use the information in Table 1 to answer the question.

A scientist finds an unknown mineral that might be mineral Y. She decides to do several tests and compare her results with characteristics of mineral Y.

Identify which characteristic can be determined using **each** test.

	the types of chemicals that make up the mineral	the strength of the connections between particles in the mineral
pour some vinegar over a small piece of the mineral	☐	☐
slowly add mass on top of a small piece of the mineral	☐	☐
place a small piece of the mineral in a beaker of water	☐	☐
use a rock hammer to carefully break pieces off the mineral	☐	☐

Session 3 Item 29 (TEI) - Rubric



	the types of chemicals that make up the mineral	the strength of the connections between particles in the mineral
pour some vinegar over a small piece of the mineral	☑	☐
slowly add mass on top of a small piece of the mineral	☐	☑
place a small piece of the mineral in a beaker of water	☑	☐
use a rock hammer to carefully break pieces off the mineral	☐	☑

Scoring Notes:

This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 4 correct responses; therefore 1 point will be awarded if the student selects 2 or more correct responses.

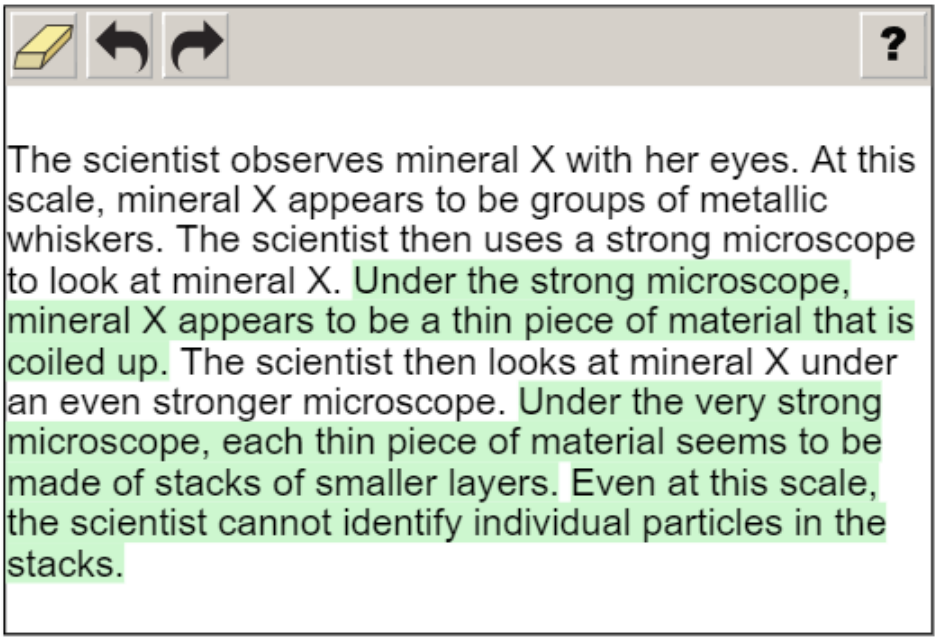
Session 3 Item 31 (TEI)

Unlike the other two minerals in the table, mineral X does not have tiny pieces that appear to be separated from each other.

Select the **three** statements that best explain that mineral X is made of particles that are too small to see.

The scientist observes mineral X with her eyes. At this scale, mineral X appears to be groups of metallic whiskers. The scientist then uses a strong microscope to look at mineral X. Under the strong microscope, mineral X appears to be a thin piece of material that is coiled up. The scientist then looks at mineral X under an even stronger microscope. Under the very strong microscope, each thin piece of material seems to be made of stacks of smaller layers. Even at this scale, the scientist cannot identify individual particles in the stacks.

Session 3 Item 31 (TEI) - Rubric



Scoring Notes:

This item is worth 2 points. Partial credit (1 point) will be awarded if half or more of the student responses are correct. For this item, the key contains 3 correct responses; therefore 1 point will be awarded if the student selects 2 correct responses.

Session 3 Item 41 (TPD)

Part A

A group of students observed several properties of five different materials. The students recorded their observations in the table.

Select the material that is **most likely** a metal.

Material	Reflects Light?	Attracted to a Magnet?	Can Bend into Different Shapes?	Conducts Heat?
A	yes	no	no	no
B	yes	no	yes	no
C	yes	no	yes	yes
D	yes	yes	yes	yes
E	yes	yes	yes	no

Click To Respond

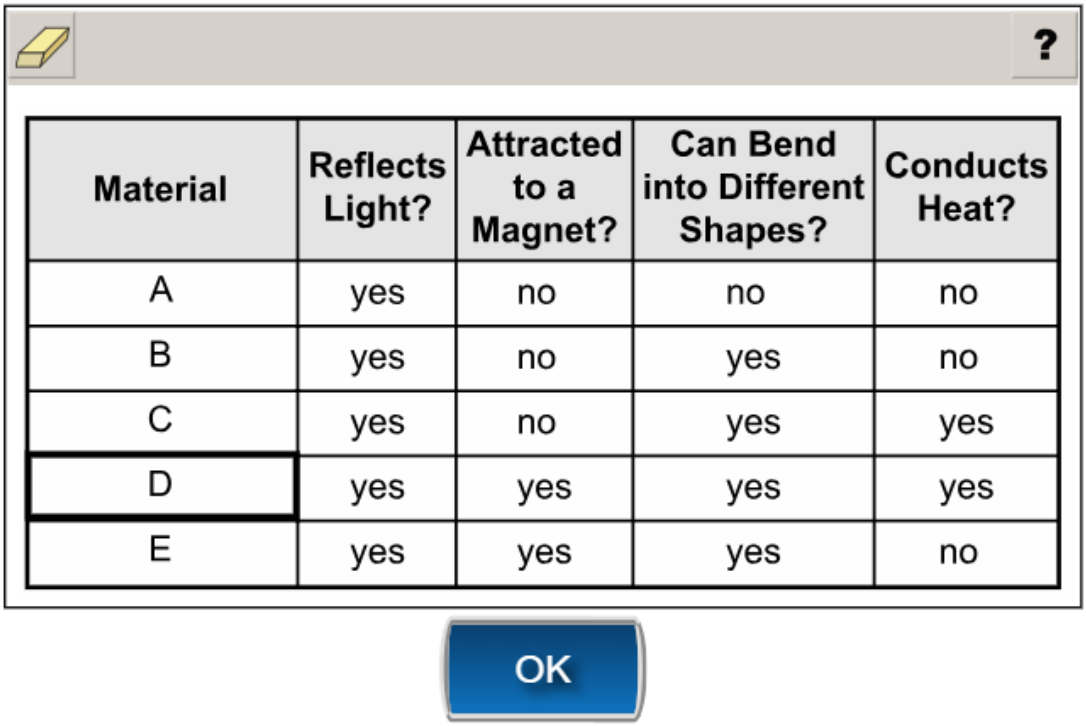
Part B

Select the correct answer from **each** drop-down menu to support the answer to Part A.

Since metals always [▼], this means that the material most likely to be a metal has this property. Since very few non-metal objects [▼], an object that has this property is probably a metal.

Session 3 Item 41 (TPD) - Rubric

Part A



Material	Reflects Light?	Attracted to a Magnet?	Can Bend into Different Shapes?	Conducts Heat?
A	yes	no	no	no
B	yes	no	yes	no
C	yes	no	yes	yes
D	yes	yes	yes	yes
E	yes	yes	yes	no

OK

Part B

Since metals always [conduct heat ▾], this means that the material most likely to be a metal has this property. Since very few non-metal objects [are attracted to a magnet ▾], an object that has this property is probably a metal.