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.

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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      |                      | 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      | Standalone Items     | 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 |
| 3      |                      | 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.a  
CCC: Energy and Matter |
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| 3       | Standalone Items   | 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.

- **Rafflesia plants**
  - Eat fruit and spread seeds
  - Protect against cold temperatures
  - Provide materials for growth
  - Provide food from other parts of the rain forest
  - Visit flowers and spread pollen

- **Tetrastigma vines**

- **Insects**

- **Small rain forest mammals**
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.
*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.

The flask was sealed with a stopper. The total mass of the materials was measured. The flask was tilted over so that the liquids were mixed. A white solid formed in the flask. The liquid changed to a lighter blue. The total mass of the materials was measured again.
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.

The flask was sealed with a stopper. The total mass of the materials was measured. The flask was tilted over so that the liquids were mixed. A white solid formed in the flask. The liquid changed to a lighter blue. The total mass of the materials was measured again.
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.

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<th>Score</th>
<th>Description</th>
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<tr>
<td>2</td>
<td>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.</td>
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<tr>
<td>1</td>
<td>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.</td>
</tr>
<tr>
<td>0</td>
<td>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.</td>
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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.
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.

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<th>Event</th>
<th>Atmosphere and Geosphere</th>
<th>Biosphere and Geosphere</th>
<th>Hydrosphere and Biosphere</th>
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<tr>
<td>A drought causes the farmer’s crops to die.</td>
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</tr>
<tr>
<td>Roots from crops stop holding down the soil.</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td>Wind blows away the loose soil.</td>
<td>![ ]</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
</tbody>
</table>
### Session 1 Item 9 (TEI) - Rubric

<table>
<thead>
<tr>
<th></th>
<th>atmosphere and geosphere</th>
<th>biosphere and geosphere</th>
<th>hydrosphere and biosphere</th>
</tr>
</thead>
<tbody>
<tr>
<td>A drought causes the farmer’s crops to die.</td>
<td>❌</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Roots from crops stop holding down the soil.</td>
<td>✗</td>
<td>✓</td>
<td>❌</td>
</tr>
<tr>
<td>Wind blows away the loose soil.</td>
<td>✓</td>
<td>❌</td>
<td>❌</td>
</tr>
</tbody>
</table>

**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.

- Holding Ponds: Rainwater flows into large concrete ponds and slowly evaporates.
- Porous Pavement: Rainwater drains through the pavement of streets and parking lots and soaks into the soil.
- Rain Barrels: Rainwater drains off rooftops and is stored in barrels.
- Rain Gardens: Rainwater is trapped by garden plants and slowly soaks into the soil.
Session 1 Item 11 (TEI) - Rubric

Holding Ponds
Rainwater flows into large concrete ponds and slowly evaporates.

Porous Pavement
Rainwater drains through the pavement of streets and parking lots and soaks into the soil.

Rain Barrels
Rainwater drains off rooftops and is stored in barrels.

Rain Gardens
Rainwater is trapped by garden plants and slowly soaks into the soil.
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.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>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.</td>
</tr>
<tr>
<td>1</td>
<td>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.</td>
</tr>
<tr>
<td>0</td>
<td>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.</td>
</tr>
</tbody>
</table>

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.
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.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Correct statement that describes movement of matter</th>
<th>Correct statement, but does not describe movement of matter</th>
<th>Not a correct statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Sun provides matter that helps the algae grow.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algae get energy from the Sun.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shrimp get nutrients from the bacteria.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bacteria recycle waste materials in the ecosystem.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Algae, bacteria, and shrimp release gases into the ecosystem.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Session 1 Item 15 (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 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.
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?

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

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

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

- 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 \( \triangleright \) because the sunlight is coming from overhead \( \triangleright \).

Later, when the students walk home at 3 P.M., their shadows are longer \( \triangleright \) because the sunlight is coming from between the horizon and overhead \( \triangleright \).

**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.
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 there, but it is so far away that you only see the little speck in the sky. If we were a little closer to the North Star or Sun, the Sun would look the same way. We are so close to our Sun that when the Earth spins and the Sun “rises” it just outshines 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 is lower in the sky than it is during the night. It is not moving, but we are so part of it is that we partly turn away from the star, and then the Sun is there to outshine 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 there, 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’ 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 too 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 too 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 to 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 shows 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 shows 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 it is 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. Karen’s 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, “Karen’s shadow will be very short. Nancy’s shadow will be a little longer. Sheila’s shadow will be the longest of 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 cousin’s 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 shining 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 shining 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.”
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.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Student’s response correctly explains how two parts of the plan lead to an increase in the bear population.</td>
</tr>
<tr>
<td>1</td>
<td>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.</td>
</tr>
<tr>
<td>0</td>
<td>Student’s response does not explain how two parts of the plan lead to an increase in the bear population. <strong>OR</strong> Student’s response is blank, irrelevant, or too brief to evaluate.</td>
</tr>
</tbody>
</table>

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.
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.

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Type of Chemicals</th>
<th>Strength of Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pour some vinegar over a small piece of the mineral</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Slowly add mass on top of a small piece of the mineral</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Place a small piece of the mineral in a beaker of water</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Use a rock hammer to carefully break pieces off the mineral</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Session 3 Item 29 (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 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

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.

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.

<table>
<thead>
<tr>
<th>Material</th>
<th>Reflects Light?</th>
<th>Attracted to a Magnet?</th>
<th>Can Bend into Different Shapes?</th>
<th>Conducts Heat?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>B</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>C</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>D</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>E</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Material</th>
<th>Reflects Light?</th>
<th>Attracted to a Magnet?</th>
<th>Can Bend into Different Shapes?</th>
<th>Conducts Heat?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>B</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>C</td>
<td>yes</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>D</td>
<td>yes</td>
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<td>E</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
</tbody>
</table>

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.