This document contains the answer keys, rubrics, and Scoring Notes for items on the Science Grade 7 Practice Test. Additional Practice Test resources are available in the LDOE Practice Test Library.

<table>
<thead>
<tr>
<th>Session</th>
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<th>Item Type</th>
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<th>Point Value</th>
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| 1       | Volcanic Carbon | 12       | CR        | See Rubric | 2           | PE: 7-MS-ESS3-5  
SEP: 1. Asking questions (for science) and defining problems (for engineering)  
DCI: MS.ESS3D.a  
CCC: Stability and Change |
|         |                | 13       | MC        | D       | 1           | PE: 7-MS-LS2-5  
SEP: 6. Constructing explanations (for science) and designing solutions (for engineering)  
DCI: MS.LS2C.b  
CCC: Stability and Change |
| 1       | Standalone Items | 14       | TEI       | See Rubric | 2           | PE: 7-MS-PS1-2  
SEP: 4. Analyzing and interpreting data  
DCI: MS.PS1B.a  
CCC: Patterns |
| 1       |                | 15       | TEI       | See Rubric | 2           | PE: 7-MS-LS1-3  
SEP: 7. Engaging in argument from evidence  
DCI: MS.LS1A.c  
CCC: Systems and System Models |
| 2       | Zebra Mussels  | 16       | TPD: TEI/ MC | See Rubric | 2           | PE: 7-MS-LS2-5  
SEP: 6. Constructing explanations (for science) and designing solutions (for engineering)  
DCI: MS.ESS1B.a  
CCC: Stability and Change |
| 2       |                | 17       | MC        | D       | 1           | PE: 7-MS-LS2-4  
SEP: 7. Engaging in argument from evidence  
DCI: MS.LS2C.a  
CCC: Stability and Change |
| 2       |                | 18       | TEI       | See Rubric | 1           | PE: 7-MS-LS2-5  
SEP: 6. Constructing explanations (for science) and designing solutions (for engineering)  
DCI: MS.ESS1B.a  
CCC: Stability and Change |
| 2       |                | 19       | TPD: MC/ MC | C, B     | 2           | PE: 7-MS-LS2-4  
SEP: 7. Engaging in argument from evidence  
DCI: MS.LS2C.a  
CCC: Stability and Change |
| 2       |                | 20       | ER        | See Rubric | 9           | PE: 7-MS-LS2-5  
SEP: 6. Constructing explanations (for science) and designing solutions (for engineering)  
DCI: MS.ESS1B.a  
CCC: Stability and Change |
| 2       | Standalone Items | 21       | MS        | C, D, G  | 1           | PE: 7-MS-ESS2-4  
SEP: 2. Developing and using models  
DCI: MS.ESS2C.a  
CCC: Energy and Matter |
| 2       |                | 22       | TEI       | See Rubric | 2           | PE: 7-MS-PS1-4  
SEP: 2. Developing and using models  
DCI: MS.PS1A.f  
CCC: Cause and Effect |
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<td>28</td>
<td>MC</td>
<td>D</td>
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<td>PE: 7-MS-ESS2-6&lt;br&gt;SEP: 2. Developing and using models&lt;br&gt;DCI: MS.ESS2D.a&lt;br&gt;CCC: Cause and Effect</td>
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<td>The Arizona Monsoon</td>
<td>29</td>
<td>MS</td>
<td>A, C, D</td>
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<td>PE: 7-MS-PS1-2&lt;br&gt;SEP: 4. Analyzing and interpreting data&lt;br&gt;DCI: MS.PS1B.a</td>
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GRADE 7 PRACTICE TEST ANSWER KEY
<table>
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<tr>
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<th>Key</th>
<th>Point Value</th>
<th>Alignment</th>
</tr>
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| 3       |     | 35       | TPD: MC/ MC | B, D | 2 | PE: 7-MS-LS4-4  
SEP: 6. Constructing explanations (for science) and designing solutions (for engineering)  
DCI: MS.LS4B.a  
CCC: Cause and Effect |
| 3       |     | 36       | MS        | A, D, F | 1 | PE: 7-MS-ESS3-5  
SEP: 1. Asking questions (for science) and defining problems (for engineering)  
DCI: MS.ESS3D.a  
CCC: Stability and Change |
| 3       |     | 37       | MC        | B   | 1 | PE: 7-MS-PS1-2  
DCI: MS.PS1B.a  
CCC: Patterns |
| 3       |     | 38       | MC        | B   | 1 | PE: 7-MS-LS2-4  
SEP: 7. Engaging in argument from evidence  
DCI: MS.LS2C.a  
CCC: Stability and Change |
| 3       |     | 39       | TPD: MC/ TEI | See Rubric | 2 | PE: 7-MS-LS4-5  
SEP: 8. Obtaining, evaluating, and communicating information  
DCI: MS.LS4B.b  
CCC: Cause and Effect |
| 3       |     | 40       | TEI       | See Rubric | 1 | PE: 7-MS-PS3-4  
SEP: 3. Planning and carrying out investigations  
DCI: MS.PS3A.d |
| 3       |     | 41       | MC        | C   | 1 | PE: 7-MS-LS1-3  
SEP: 7. Engaging in argument from evidence  
DCI: MS.LS1A.c  
CCC: Systems and System Models |
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 seven answer options and more than one correct answer: for MS items, the question identifies the number of correct answers, unless it is part of a Two-part Dependent (TPD). In a TPD, the question in Part B will then be worded to “select all that apply.” All MS items are worth one point each.

- Technology Enhanced Items (TEI): uses technology to capture student comprehension in authentic ways. 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)

Drag the particles into the boxes to show how temperature affects the motion of particles in the ice bath experiment model.

Particles may be used more than once.
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 1 Item 3 (TEI) - Rubric

Select the correct answer from each drop-down menu to complete the paragraph about experimental variables in the ice bath experiment.

During the ice bath experiment, the surface area of the ice was the independent variable and the time for the ice to melt was the dependent variable. The mass of the ice was held constant for both experiments.

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 5 (TEI)

Drag the descriptions into the correct boxes to complete the model describing the types of spider plant reproduction.

Not all descriptions will be used.

<table>
<thead>
<tr>
<th>Asexual Reproduction</th>
<th>Sexual Reproduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offspring receive genes from two parents and can have different traits than the parents.</td>
<td>Offspring receive genes from two parents and are identical to the parents.</td>
</tr>
<tr>
<td>Offspring receive genes from one parent and are identical to that parent.</td>
<td>Offspring receive genes from one parent and can have different traits than that parent.</td>
</tr>
</tbody>
</table>
Session 1 Item 5 (TEI) - Rubric

Offspring receive genes from two parents and are identical to the parents.

Offspring receive genes from one parent and can have different traits than that parent.

<table>
<thead>
<tr>
<th>Asexual Reproduction</th>
<th>Sexual Reproduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offspring receive genes from one parent and are identical to that parent.</td>
<td>Offspring receive genes from two parents and can have different traits than the parents.</td>
</tr>
</tbody>
</table>
Session 1 Item 8 (CR)

The botanist from the nursery is planning to develop a large number of new spider plants with larger flowers.

Identify the type of reproduction the botanist should use to develop the new spider plants and explain why this type of reproduction is preferable.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Student’s response correctly identifies the type of reproduction the botanist should use and explains why this type of reproduction is preferable.</td>
</tr>
<tr>
<td>1</td>
<td>Student’s response correctly identifies the type of reproduction the botanist should use OR explains why this type of reproduction is preferable.</td>
</tr>
<tr>
<td>0</td>
<td>Student’s response does <strong>not</strong> correctly identify the type of reproduction or explain why this type of reproduction is preferable. <strong>OR</strong> Student’s response is blank, irrelevant, or too brief to evaluate.</td>
</tr>
</tbody>
</table>

Scoring Notes:

- Identifies sexual reproduction as the type of reproduction the botanist should use (1 point)
- Explains why sexual reproduction is preferable (1 point)

Examples include:

- The botanist should use sexual reproduction to produce the new spider plants because sexual production results in offspring with different traits, like larger flowers.
- The botanist should use sexual reproduction to make the new plants because asexual reproduction will only produce spider plant offspring with the same types of traits as the parents.

Accept other reasonable answers.
Session 1 Item 10 (TPD)

One way that human activities can add carbon to the atmosphere is through the burning of fossil fuels that contain methane (CH₄). This process returns carbon to the atmosphere in the form of carbon dioxide (CO₂).

Part A

When fossil fuels that contain CH₄ are heated, a reaction occurs. The CH₄ molecules react with oxygen (O₂) molecules in the air to form CO₂ molecules and water (H₂O) molecules.

Drag the correct number of each molecule into the boxes to show how many molecules of CO₂ and H₂O are formed during this reaction.

Not all molecules will be used.
Session 1 Item 10 (TPD), continued

Part B

Which statement about how atoms and molecules move through the slow carbon cycle is best supported by the answer to Part A?

- The total number of atoms for each element does not change even after a reaction occurs in the slow carbon cycle.
- The total mass of each element always changes after a reaction occurs in the slow carbon cycle.
- The total number of molecules formed always changes after a reaction occurs in the slow carbon cycle.
- The total mass of each element decreases each time a reaction occurs in the slow carbon cycle.
Part B

Which statement about how atoms and molecules move through the slow carbon cycle is best supported by the answer to Part A?

a. The total number of atoms for each element does not change even after a reaction occurs in the slow carbon cycle.

b. The total mass of each element always changes after a reaction occurs in the slow carbon cycle.

c. The total number of molecules formed always changes after a reaction occurs in the slow carbon cycle.

d. The total mass of each element decreases each time a reaction occurs in the slow carbon cycle.
Session 1 Item 12 (CR)

The data in Graph 2 show a steady increase in the concentration of atmospheric CO\(_2\) over a 50-year period.

Part A

Explain why the total mass of carbon must be decreasing in a different step of the slow carbon cycle based on the increase in atmospheric CO\(_2\).

Part B

Identify the part of the slow carbon cycle in which the total amount of carbon is most likely decreasing the most and explain why this decrease occurs.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Student’s response correctly explains why the total mass of carbon must be decreasing in a different step of the cycle AND explains which part of the slow carbon cycle the total amount of carbon is most likely decreasing the most.</td>
</tr>
<tr>
<td>1</td>
<td>Student’s response correctly explains why the total mass of carbon must be decreasing in a different step of the cycle OR explains in which part of the slow carbon cycle the total amount of carbon is most likely decreasing the most.</td>
</tr>
<tr>
<td>0</td>
<td>Student’s response does not correctly explain why the total mass of carbon must be decreasing in a different step of the cycle or explain which part of the slow carbon cycle the total amount of carbon is most likely decreasing the most. OR Student’s response is blank, irrelevant, or too brief to evaluate.</td>
</tr>
</tbody>
</table>

Scoring Notes:

- Explanation of why the total mass of carbon must be decreasing in a different step of the cycle if CO\(_2\) is increasing in the atmosphere (1 point)
- Explanation of which part of the slow carbon cycle most likely has the biggest decrease in the total amount of carbon (1 point)
Session 1 Item 12 (CR), continued

Examples include:

Part A

- The total amount of carbon in the world is not changing. Because matter is conserved in all processes and reactions, carbon must decrease in one place if it increases in another.

Part B

- The mass of carbon is likely decreasing the most in fossil fuel deposits. Most of the increase in atmospheric CO$_2$ is due to burning fossil fuels, and fossil fuel comes from underground deposits.
- Volcanic eruptions do not increase atmospheric CO$_2$ as much as burning fossil fuels, so carbon must be decreasing in fossil fuel deposits faster than in other underground deposits like limestone and rocks.

Accept other reasonable answers.
Session 1 Item 14 (TEI) - Rubric

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

Zinc sulfide can be made by heating a mixture of zinc and sulfur. The properties of each substance in this process are shown in the table.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Physical State</th>
<th>Melting Point (°C)</th>
<th>Solubility (in water, pH = 7)</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>zinc</td>
<td>solid</td>
<td>419.5</td>
<td>insoluble</td>
<td>silver</td>
</tr>
<tr>
<td>sulfur</td>
<td>solid</td>
<td>115.2</td>
<td>insoluble</td>
<td>yellow</td>
</tr>
<tr>
<td>zinc sulfide</td>
<td>solid</td>
<td>1,830.0</td>
<td>insoluble</td>
<td>white</td>
</tr>
</tbody>
</table>

*Source: American Elements*

Based on the information in the table, select the correct answer from each drop-down menu to complete the paragraph.

When a mixture of zinc and sulfur is heated, a chemical reaction occurs. This is supported by the data in the table showing that zinc sulfide is a different color. During this process, the zinc and sulfur atoms rearrange to form new molecules.

**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 15 (TEI) - Rubric

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

Infections sometimes occur when viruses or harmful bacteria enter the human body. The infection can then result in body temperature changes. The graph shows these changes in body temperature during an infection compared to a normal body temperature.

![Graph: Body Temperature Changes during an Infection]

**Source:** Joseph G. Cannon

Use the graph to select the correct answer from each drop-down menu to complete the paragraph.

Infected cells can release chemicals that travel through the bloodstream to alert the brain. The brain then sends signals along nerve cells to increase the temperature of the body. White blood cells are brought in to the infected area using the circulatory system. Based on the graph, the infected area most likely stops releasing chemicals to alert the brain of an infection 5 hours after the infection starts.
Session 1 Item 15 (TEI) - Rubric, continued

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 2 Item 16 (TPD)

Part A

Drag the descriptions into the correct order to show how zebra mussels can affect a waterway.

Part B

Which statement describes the most effective way to monitor waterways to prevent the effects of zebra mussels described in Part A?

- (a) Take samples of the surface water to look for zebra mussel waste products.
- (b) Measure algae and plankton levels at the bottom of the waterway.
- (c) Measure how clear the water is to detect changing algae and plankton levels.
- (d) Perform random visual inspections of the bottom of the waterway to look for zebra mussels.
Session 2 Item 16 (TPD) - Rubric

Part A

zebra mussels eat algae and plankton
water becomes clearer to see through
sunlight reaches bottom of waterway
waterway vegetation increases

Part B

Which statement describes the most effective way to monitor waterways to prevent the effects of zebra mussels described in Part A?

- Take samples of the surface water to look for zebra mussel waste products.
- Measure algae and plankton levels at the bottom of the waterway.
- Measure how clear the water is to detect changing algae and plankton levels.
- Perform random visual inspections of the bottom of the waterway to look for zebra mussels.
Session 2 Item 18 (TEI)

In 2007, mussels similar to zebra mussels were found in waterways near Lake Mead along the Colorado River.

Select the location showing where an inspection checkpoint would be most effective in preventing the further spread of these mussels.

Source: USGS.
Session 2 Item 18 (TEI) - Rubric

Source: USGS.
Session 2 Item 20 (ER)

As you respond to Part A, Part B, and Part C, follow the directions below.

- Address all of the instructions in each prompt.
- Use evidence from the information provided and your own knowledge of science to support your responses.

Part A

Describe one way scientists near Lake Tahoe can detect if the lake has been impacted by zebra mussels.

Part B

Identify and explain one potential issue with the monitoring approach used in areas like Lake Tahoe.

Part C

Identify one possible solution to the issue identified in Part B and explain how the solution would address the issue.

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.

PART A (0-3 points maximum)

- 1 point for identifying a detection method
- 2 points for describing detection method

PART B (0-3 points maximum)

- 1 point for identifying a potential issue
- 2 points for explaining potential issue
Session 2 Item 20 (ER), continued

PART C (0-3 points maximum)

- 1 point for identifying a potential solution
- 2 points for explaining how solution addresses issue

Score Information

PART A: Student identifies a detection method (1 point) and explains how it can be used to detect if a lake has been impacted by zebra mussels (2 points).

1. Monitor the lake bed for an increased growth in vegetation because there should be more vegetation than usual if zebra mussels start to spread into an area.

2. Measure the clarity or quality of the water over time because the water should become much cleaner than usual if zebra mussels start to spread into an area.

3. Monitor for changes in local fish populations because zebra mussels can result in a decrease in fish when they eat the algae and plankton.

NOTE: Accept any other plausible descriptions of a detection method used to monitor for zebra mussels in a lake.

Part B: Student identifies one potential issue with the monitoring approach (1 point) and explains how this issue poses a problem (2 points).

1. One potential issue is that zebra mussels can be very hard to see due to their size, so it may be difficult to spot them during inspections. This means zebra mussels could still spread to an area that uses inspections.

2. One problem is that inspection methods only identify zebra mussels once they have entered an area, which means the ecosystem has already been affected.

NOTE: Accept any other plausible potential issues with the monitoring approach used for zebra mussels.
Session 2 Item 20 (ER), continued

**Part C:** Student identifies one potential solution to the issue identified in Part B (1 point) and explains how this solution would address the issue (2 points).

1. One potential solution is to thoroughly clean any boats before and after putting them into a lake. This should help remove any zebra mussels that are harder to see and prevent zebra mussels from being transported between waterways.

NOTE: Accept any other plausible
Session 2 Item 22 (TEI)

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

A student is running an experiment to measure how the pressure of a gas changes with temperature. The student will measure the pressure of the gas inside a bulb for three different temperatures, as shown in the experiment setup.

Drag the pressure gauges into the correct boxes to show how the motion of the gas particles at each temperature affects the pressure in the bulb.

Each pressure gauge may be used more than once.

![Diagram of pressure gauges and bulbs with temperatures](image-url)
Session 2 Item 22 (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.
Use the information and your knowledge of science to answer the question.

Coastal regions are often affected by nearby ocean currents. The map shows how different ocean currents affect the United States.

Use the map to complete the table by selecting the boxes that best describe how ocean currents affect the climate in each coastal region.

Select one box per row.
Session 2 Item 23 (TEI) - Rubric

<table>
<thead>
<tr>
<th></th>
<th>Decrease the Temperature of Coastal Region</th>
<th>Increase the Temperature of Coastal Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Coast of the United States</td>
<td></td>
<td>![ ]</td>
</tr>
<tr>
<td>West Coast of the United States</td>
<td>![ ]</td>
<td>![ ]</td>
</tr>
<tr>
<td>Southern Alaska</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 3 Item 24 (TEI) - Rubric

Drag the labels into the correct order to complete the model showing the flow of energy during the swampland leaf experiment.

- sunlight
- chlorophyll in swampland leaf
- glucose
- starch
Session 3 Item 25 (TEI) - Rubric

Select the correct answer from each drop-down menu to complete the sentences about the swampland leaf starch test results shown in Figure 2.

The starch test results show that the parts of the leaf covered by the black paper strip produce an amount of glucose that is less than the amount of glucose produced by the parts of the leaf exposed to sunlight. This suggests that the amount of photosynthesis that occurs decreases when less light is available.
Session 3 Item 26 (TPD)

Part A

A crane is a type of bird that lives in Louisiana swamplands. Cranes eat both plants and animals.

Drag each label into the correct box to complete the model showing how matter is cycled between the crane and the plant.

Not all labels will be used.

Part B

Which statement best explains one role of energy for the model in Part A?

- Glucose reacts with oxygen and absorbs energy from the crane to form carbon dioxide.
- Glucose reacts with oxygen to release energy for the crane to use.
- The crane absorbs energy directly from the glucose molecules.
- The crane transfers energy to the carbon dioxide molecules.
Session 3 Item 26 (TPD) - Rubric

Part A

fermentation
anaerobic respiration

carbon dioxide
water
sunlight

aerobic respiration
photosynthesis

glucose
oxygen

Part B

Which statement best explains one role of energy for the model in Part A?

- Glucose reacts with oxygen and absorbs energy from the crane to form carbon dioxide.
- Glucose reacts with oxygen to release energy for the crane to use.
- The crane absorbs energy directly from the glucose molecules.
- The crane transfers energy to the carbon dioxide molecules.
Session 3 Item 27 (CR)

Trees and other vegetation in swampland ecosystems play a key role in providing oxygen to organisms within the ecosystem. Changes in atmospheric oxygen levels in an ecosystem can have a large impact on the different organisms in that swampland area. Scientists have studied the effect of atmospheric oxygen levels on alligators similar to alligators found in Louisiana swamplands. The results in the two graphs show how atmospheric oxygen levels affected the mass and length of alligators in the early stages of their development.

![Graph showing alligator mass and length affected by atmospheric oxygen levels.]

Explain how low atmospheric oxygen levels affected alligator growth in terms of cellular respiration.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Student’s response correctly explains how alligator growth was affected by atmospheric oxygen levels AND explains alligator growth in terms of cellular respiration.</td>
</tr>
<tr>
<td>1</td>
<td>Student’s response correctly explains how alligator growth was affected by atmospheric oxygen levels OR explains alligator growth in terms of cellular respiration.</td>
</tr>
<tr>
<td>0</td>
<td>Student’s response does not correctly explain how alligator growth was affected by atmospheric oxygen levels or explain alligator growth in terms of cellular respiration. OR Student’s response is blank, irrelevant, or too brief to evaluate.</td>
</tr>
</tbody>
</table>

Source: Journal of Experimental Biology.
Session 3 Item 27 (CR), continued

Scoring Notes:

- Explanation of how alligator growth was affected by atmospheric oxygen levels (1 point)
- Explanation of alligator growth in terms of cellular respiration (1 point)

Examples include:

- Alligators with low atmospheric oxygen levels were smaller than alligators with normal or high atmospheric oxygen levels because they had less atmospheric oxygen to react with glucose in their body during cellular respiration, which means less energy for building new cells.

Accept other reasonable answers.
Session 3 Item 31 (CR)

A number of atmospheric conditions can contribute to the change from hot and dry weather to monsoon weather observed during Arizona summers.

Using the information in Map 1, Map 2, and Map 3, identify two changes in atmospheric conditions that scientists should collect data on to determine the cause of this change in weather. Explain how the data for each change would provide information on monsoon formation.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Student’s response correctly identifies two changes in atmospheric conditions AND explains how the data for each change would provide information on monsoon formation.</td>
</tr>
<tr>
<td>1</td>
<td>Student’s response correctly identifies one change in atmospheric conditions and explains how the data for that change would provide information on monsoon formation, but does not correctly identify and explain a second change. &lt;br&gt; OR &lt;br&gt; Student correctly identifies two changes in atmospheric conditions but does not explain how the data for each change would provide information on monsoon formation.</td>
</tr>
<tr>
<td>0</td>
<td>Student’s response does not correctly identify two changes in atmospheric conditions nor explain how the data for each change would provide information on monsoon formation. &lt;br&gt; OR &lt;br&gt; Student’s response is blank, irrelevant, or too brief to evaluate.</td>
</tr>
</tbody>
</table>

Scoring Notes:

- Identification of one atmospheric condition that scientists should collect data on and an explanation of how the data for the change identified would provide information on monsoon formation (1 point)
- Identification of a second atmospheric condition that scientists should collect data on and an explanation of how the data for the change identified would provide information on monsoon formation (1 point)
Examples include:

- The scientists should collect data on changes or shifts in wind patterns to determine how much moisture is being pulled into the Arizona area from surrounding areas at different times during the year.
- The scientists can collect data on air temperature to better predict where high- and low-pressure areas that contribute to monsoon formation will form.

Accept other reasonable answers.
Session 3 Item 39 (TPD)

Part A

Which statement best describes how selective breeding helps horse breeders produce the most desirable traits for racing?

- a. Selective breeding produces horses with a higher rate of survival due to an increase in the genetic diversity of the horse offspring.
- b. Selective breeding helps breeders control which traits are passed on by producing horse offspring that only have the desired traits.
- c. Selective breeding uses two horse parents with the desired traits to increase the chances of passing the desired traits on to offspring.
- d. Selective breeding uses two horse parents with unknown traits to produce offspring with genetic variations and different traits.

Part B

Select the sentence that best identifies a potential negative impact of the selective breeding answer from Part A.

Horse prices had risen artificially high and selective breeding was used to improve the quality of the horses. A decline in mating means more dedication to the idea of quality over quantity among the breed.

Yet even the most purposefully applied selective breeding has produced terrible problems for the Thoroughbred breed. Because the perfect race horse is both fast and light, breeding has focused on Thoroughbreds with huge muscle concentrations but light bones. While Thoroughbreds have become faster over the years, they have also grown more fragile, producing a breed of horse with what one writer called "the heart of a locomotive and champagne-glass ankles."

Session 3 Item 39 (TPD) - Rubric

Part A
Which statement best describes how selective breeding helps horse breeders produce the most desirable traits for racing?

a) Selective breeding produces horses with a higher rate of survival due to an increase in the genetic diversity of the horse offspring.

b) Selective breeding helps breeders control which traits are passed on by producing horse offspring that only have the desired traits.

c) Selective breeding uses two horse parents with the desired traits to increase the chances of passing the desired traits on to offspring.

d) Selective breeding uses two horse parents with unknown traits to produce offspring with genetic variations and different traits.

Part B
Select the sentence that best identifies a potential negative impact of the selective breeding answer from Part A.

Horse prices had risen artificially high and selective breeding was used to improve the quality of the horses. A decline in mating means more dedication to the idea of quality over quantity among the breed.

Yet even the most purposefully applied selective breeding has produced terrible problems for the Thoroughbred breed. Because the perfect race horse is both fast and light, breeding has focused on Thoroughbreds with huge muscle concentrations but light bones. While Thoroughbreds have become faster over the years, they have also grown more fragile, producing a breed of horse with what one writer called “the heart of a locomotive and champagne-glass ankles.”

Session 3 Item 40 (TEI)

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

Students in a science class are designing an experiment to test how heat affects the kinetic energy of gas molecules. The students will add different amounts of thermal energy to three closed containers of gas.

Drag the correct label into each box in the table to identify the independent variable and the dependent variable in the experiment.

Not all labels will be used.

| amount of thermal energy added | type of gas used |
| size of the container | speed of gas molecules |

**Independent Variable**

| Dependent Variable |  |
### Session 3 Item 40 (TEI) - Rubric

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>amount of thermal energy added</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable</td>
<td>speed of gas molecules</td>
</tr>
</tbody>
</table>

- type of gas used
- size of the container