# CAASPP

California Assessment of Student Performance and Progress

# California Science Test
# Practice Test
# Scoring Guide

# Grade Eight

# Table of Contents

# About the Practice Test Scoring Guide

## Introduction to Practice Test Scoring Guide

This California Science Test (CAST) Practice Test Scoring Guide offers details about the items, student response types, correct responses, and related scoring considerations for the practice test items. These items have been selected to show some of the new approaches to measuring the California Next Generation Science Standards (CA NGSS) that can be found in the assessment. The practice test items are fully representative of all possible item types included in CAST. The practice test covers a selection of items from performance expectations (PEs) assessed in grade eight.

This scoring guide should be used alongside the online practice tests, which can be accessed on the Practice and Training Tests web page. Annotated responses are also available to help explain the rationale for each score point on selected constructed response items from the practice test on the Practice and Training Test Resources web page.

The following information is presented in a metadata table. Metadata contains specific information about each item, including the alignment of the item with the CA NGSS.

Item: This is the question number that corresponds to the question as it appears in the practice test.

Key: This represents the correct answer(s) to the item or question and includes the score point value for the item and its parts. Items are worth either one or two points. For some technology-enhanced items, a screen capture of the correct answers is included. Exemplars and rubrics are provided for constructed-response items.

PE Code: This references the standards that describe what students should know and be able to do.

Science and Engineering Practices (SEPs): These are descriptions of behaviors that students engage in as they investigate the natural world and design solutions.

Disciplinary Core Ideas (DCIs): These are essential ideas in the science disciplines that all students should understand.

Crosscutting Concepts (CCCs): These are interdisciplinary skills students should exhibit that unify the study of science and engineering through common application across fields.

Item-Level Claim Statement (ILCS): This is a brief statement that illustrates how an item aligns with the PE.

# Grade Eight Practice Test Items

## Items 1–6

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 1 | **First drop-down list:** 2<br><br>**Second drop-down list:** oxygen<br><br>(1 point) | MS-PS1-1 | 2. Developing and Using Models | PS1.A Structure and Properties of Matter | 3. Scale, Proportion, and Quantity | Identify and explain which molecular model represents formic acid given the chemical formula of formic acid and formaldehyde. |
| 2 | **First drop-down list:** dark-colored fish<br><br>**Second drop-down list:** cannot see them as well as fish of the other color<br><br>(1 point) | MS-LS4-4 | 6. Constructing Explanations and Designing Solutions | LS4.B Natural Selection | 2. Cause and Effect | Explain why one variation of the trait is more advantageous given the introduction of a predator to the environment. |
| 3 | C<br><br>(1 point) | MS-ETS1-2 | 7. Engaging in Argument from Evidence | ETS1.B Developing Possible Solutions | N/A | Select the option that meets the two criteria and provides a supporting statement. |
| 4 | Two-point item:<br>**Part A:** D<br>(1 point)<br>**Part B:**<br>**First drop-down list:** increased<br>**Second drop-down list:** decreased<br>(1 point) | MS-PS2-4 | 7. Engaging in Argument from Evidence | PS2.B Types of Interactions | 4. Systems and System Models | Construct a sound argument using evidence from the data, that an increase in an object's mass, increases the magnitude of gravitational force acting on the object. |

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 5 | **First drop-down list:** support<br><br>**Second drop-down list:** increase, which will increase the use of freshwater<br><br>(1 point) | MS-ESS3-4 | 7. Engaging in Argument from Evidence | ESS3.C Human Impacts on Earth Systems | 2. Cause and Effect | Evaluate (with reasoning) whether the provided evidence/data are sufficient to defend the claim based on almond production and the effect it has on water supplies in California. |
| 6 | Exemplars and rubric provided on the next page. | MS-LS2-1 | 4. Analyzing and Interpreting Data | LS2.A Interdependent Relationships in Ecosystems | 2. Cause and Effect | Explain how resource availability affects population growth and carrying capacities. |

## Item 6 Exemplars and Rubric

| Score | Exemplar(s) | Rubric |
|---|---|---|
| 2 | At point A, the paramecium population is growing rapidly because there's plenty of food. At point B, the growth rate slows down because now there are more paramecium and the food supply is limited.<br><br>OR<br><br>At Point A the paramecium are growing quickly because there is plenty of food but at Point B the food supply has decreased so the growth rate has slowed down. | The response includes that at point A resources are plentiful (unlimited), and the population can grow rapidly.<br><br>AND<br><br>The response includes that at point B, carrying capacity resources are limited, and so the growth rate slows down. |
| 1 | At Point A there is a lot resources for the paramecium so the population can grow rapidly.<br><br>OR<br><br>At point B there is not enough resources to support any more growth.<br><br>OR<br><br>Because after the paramecium has reached its carrying capacity and there is not enough resources, growth has slowed down. | The response includes that at point A resources are plentiful (unlimited), and the population can grow rapidly.<br><br>OR<br><br>The response includes that at point B, carrying capacity resources are limited, and so the growth rate slows down. |

| Score | Exemplar(s) | Rubric |
|---|---|---|
| 0 | The population didn't change size, just that the resources were gone.<br><br>OR<br><br>The paramecium will find a new food source and continue to grow.<br><br>OR<br><br>*&YTT%$#$D<br><br>OR<br><br>I don't know; I was never taught this. | 0-point should be awarded if a student attempts to answer the prompt but the response is incorrect or too vague (insufficient information provided) to receive credit.<br><br>A score of 0 should also be given to responses that consist only of:<br>• No relevant content provided<br>  • no response is provided (e.g., blank)<br>  • random keystrokes or nonsense verbiage<br>  • punctuation mark(s) (e.g., ".")<br>• Student's opinion of the test<br>• Direct copy of the stimulus without any attempt to answer<br>• Opinions or comments about random topics<br>• I don't know, IDK (without further elaboration)<br><br>Responses that go on to provide an answer to the prompt should be scored based on the relevant part of the response.<br><br>Additional annotated samples for this prompt can be found on the Practice and Training Test Resources web page. |

## Items 7–13

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|---|---|---|---|---|---|---|
| 7 | B<br>(1 point) | MS-ESS3-2 | 4. Analyzing and Interpreting Data | ESS3.B Natural Hazards | 1. Patterns | Evaluate the information provided on earthquakes and identify a pattern between the location and severity of a natural disaster. |
| 8 | **Row 1:** Does not show a field exists<br>**Row 2:** Does show a field exists<br>**Row 3:** Does not show a field exists<br>**Row 4:** Does show a field exists<br>(1 point) | MS-PS2-5 | 3. Planning and Carrying Out Investigations | PS2.B Types of Interactions | 2. Cause and Effect | Evaluate data to determine if there is evidence that fields exert forces on nearby objects without direct contact. |
| 9 | **First drop-down list:** seafloor spreading<br>**Second drop-down list:** presence of identical fossils<br>(1 point) | MS-ESS2-3 | 4. Analyzing and Interpreting Data | ESS1.C The History of Planet Earth | 1. Patterns | Identify patterns or relationships in the data that can act as evidence of the past plate motions described in the background information. |
| 10 | D<br>(1 point) | MS-PS3-4 | 3. Planning and Carrying Out Investigations | PS3.B Conservation of Energy and Energy Transfer | 3. Scale, Proportion, and Quantity | Select the suitable equipment necessary to investigate heat transfer. |

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 11 | C (1 point) | MS-LS3-1 | 2. Developing and Using Models | LS3.B Variation of Traits | 6. Structure and Function | Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. |
| 12 | C (1 point) | MS-ESS3-5 | 1. Asking Questions and Defining Problems | ESS3.D Global Climate Change | 7. Stability and Change | Ask a testable question that could be used to evaluate global impacts from a volcano that has erupted. |
| 13 | Exemplars and rubric provided on the next page. | MS-LS2-4 | 7. Engaging in Argument from Evidence | LS2.C Ecosystem Dynamics, Functioning, and Resilience | 7. Stability and Change | Link the evidence/ data to a claim about how the impact of La Niña caused a change in the rate of photosynthesis within a tropical forest ecosystem. |

## Item 13 Exemplars and Rubric

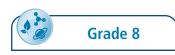| Score | Exemplar(s) | Rubric |
|---|---|---|
| 2 | The rate of photosynthesis will decrease. The graph shows that as light intensity decreases then $CO_2$ intake decreases too. | The response includes that the rate of photosynthesis will decrease.<br><br>AND<br><br>The response includes that the graph shows as light intensity decreases, the $CO_2$ uptake decreases. |
| 1 | The rate of photosynthesis will decrease.<br><br>OR<br><br>With less sunlight, the plants take up less carbon dioxide. | The response includes that the rate of photosynthesis will decrease.<br><br>OR<br><br>The response includes that the graph shows as light intensity decreases, the $CO_2$ uptake decreases. |
| 0 | The rate of photosynthesis will increase.<br><br>OR<br><br>The rate of photosynthesis will increase because of the warmer climate.<br><br>OR<br><br>Carbon dioxide uptake will increase.<br><br>OR<br><br>*&YTT%$#$D<br><br>OR<br><br>I don't know; I was never taught this. | 0-point should be awarded if a student attempts to answer the prompt but the response is incorrect or too vague (insufficient information provided) to receive credit.<br><br>A score of 0 should also be given to responses that consist only of:<br>• No relevant content provided<br>    • no response is provided (e.g., blank)<br>    • random keystrokes or nonsense verbiage<br>    • punctuation mark(s) (e.g., ".")<br>• Student's opinion of the test<br>• Direct copy of the stimulus without any attempt to answer<br>• Opinions or comments about random topics<br>• I don't know, IDK (without further elaboration)<br><br>Responses that go on to provide an answer to the prompt should be scored based on the relevant part of the response. Additional annotated samples for this prompt can be found on the Practice and Training Test Resources web page. |

## Items 14–19

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 14 | A (1 point) | MS-LS1-4 | 7. Engaging in Argument from Evidence | LS1.B Growth and Development of Organisms | 2. Cause and Effect | Identify evidence that is irrelevant/invalid and would not support the argument that certain flower colors attract more pollinators. |
| 15 | A (1 point) | MS-PS4-1 | 5. Using Mathematics and Computational Thinking | PS4.A Wave Properties | 1. Patterns | Use the model to identify how the energy of the wave changes based on a change in amplitude. |
| 16 | **Row 1:** Remains the same **Row 2:** Decreases **Row 3:** Increases (1 point) | MS-PS3-2 | 2. Developing and Using Models | PS3.A Definitions of Energy | 4. Systems and System Models | Use a mathematical representation to explain the mechanisms and behaviors of the gravitational potential energy of two objects that are gravitationally attracted. |
| 17 | First, second, and third options (1 point) | MS-ESS1-4 | 6. Constructing Explanations and Designing Solutions | ESS1.C The History of Planet Earth | 3. Scale, Proportion, and Quantity | Use scientific concepts, principles, and theories to explain how the evidence supports a conclusion about Earth's history based on sedimentary rock layers. |

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 18 | D (1 point) | MS-LS4-3 | 4. Analyzing and Interpreting Data | LS4.A Evidence of Common Ancestry and Diversity | 1. Patterns | Analyze pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. |
| 19 | Exemplars and rubric provided on the next page. | MS-PS1-3 | 8. Obtaining, Evaluating, and Communicating Information | PS1.B Chemical Reactions | 6. Structure and Function | Evaluate the information given on the energy used to make plastic bottles and the impact manufacturing has on natural resources. |

## Item 19 Exemplars and Rubric

| Score | Exemplar(s) | Rubric |
|---|---|---|
| 2 | Plastic B comes from corn, which is a renewable resource. Plastic A comes from oil, which is a nonrenewable resource. It takes less energy to make Plastic B than to make Plastic A, so making bottles out of Plastic B will conserve energy.<br><br>OR<br><br>Plastic A is a nonrenewable resource so it wouldn't make sense to use it when you can you use Plastic B, which is a renewable resource. It takes less energy to make something out of a renewable resource. | The response includes that the raw material for Plastic B comes from a renewable resource (corn), but the raw material for Plastic A comes from a nonrenewable resource (oil).<br><br>AND<br><br>The response includes that it takes less energy to make Plastic B than it does to make Plastic A. |
| 1 | Plastic B comes from corn, which you plant more of every year and Plastic A comes from oil, which takes millions of years to make.<br><br>OR<br><br>It takes less energy to make plastic B than plastic A, so it will save more natural resources.<br><br>OR<br><br>It takes more energy to make plastic A, so I wouldn't use that one. | The response includes that the raw material for Plastic B comes from a renewable resource (corn), but the raw material for Plastic A comes from a nonrenewable resource.<br><br>OR<br><br>The response includes that it takes less energy to make Plastic B than it does to make Plastic A. |
| 0 | It takes the same amount of energy when you are making stuff.<br><br>OR<br><br>Plastic is recyclable.<br><br>OR<br><br>Plastic A will be easier to use because it is made from oil.<br><br>OR<br><br>*&YTT%$#$D<br><br>OR<br><br>I don't know; I was never taught this. | 0-point should be awarded if a student attempts to answer the prompt but the response is incorrect or too vague (insufficient information provided) to receive credit.<br><br>A score of 0 should also be given to responses that consist only of:<br>• No relevant content provided<br>   • no response is provided (e.g., blank)<br>   • random keystrokes or nonsense verbiage<br>   • punctuation mark(s) (e.g., ".")<br>• Student's opinion of the test<br>• Direct copy of the stimulus without any attempt to answer Opinions or comments about random topics<br>• I don't know, IDK (without further elaboration)<br><br>Responses that go on to provide an answer to the prompt should be scored based on the relevant part of the response. |

## Items 20–34

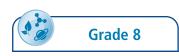| Item | Key | PE | SEP | DCI | CCC | ILCS |
|---|---|---|---|---|---|---|
| 20 | Second and third options<br><br>(1 point) | MS-LS4-5 | 8. Obtaining, Evaluating, and Communicating Information | LS4.B Natural Selection | 2. Cause and Effect | Identify reliable resource material to research genetically modified golden rice. |
| 21 | **Speed:** Approximately doubles<br><br>**Kinetic Energy:** Approximately quadruples<br><br>(1 point) | MS-PS3-1 | 4. Analyzing and Interpreting Data | PS3.A Definitions of Energy | 3. Scale, Proportion, and Quantity | Determine that increasing the object's speed results in an increase of the object's kinetic energy proportional to the square of its speed. |
| 22 | A<br><br>(1 point) | MS-ESS2-4 | 2. Developing and Using Models | ESS2.C The Roles of Water in Earth's Surface Processes | 5. Energy and Matter | Identify the processes operating within the water cycle and the role living organisms have on the water cycle. |
| 23 | **Row 1:** Sexual reproduction<br><br>**Row 2:** Sexual reproduction<br><br>**Row 3:** Asexual reproduction<br><br>**Row 4:** Both<br><br>(1 point) | MS-LS3-2 | 2. Developing and Using Models | LS3.B Variation of Traits | 2. Cause and Effect | Develop a model that identifies some effects or requirements of sexual and asexual reproduction. |

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 24 | Two-point item: **Part A: Row 1:** Does not require carrying an external source of energy **Row 2:** Does not require carrying an external source of energy **Row 3:** Requires carrying an external source of energy **Row 4:** Requires carrying an external source of energy (1 point) **Part B:** A (1 point) | MS-ETS1-3 | 4. Analyzing and Interpreting Data | ETS1.B Developing Possible Solutions | N/A | Identify relationships in the data sets, including relationships between design solutions and given criteria and constraints. |
| 25 | **First drop-down list:** pink **Second drop-down list:** basic (1 point) | MS-LS1-5 | 6. Constructing Explanations and Designing Solutions | LS1.B Growth and Development of Organisms | 2. Cause and Effect | Select the terms that complete the sentence, based on the student's investigation and collected data on plant color and soil pH. |
| 26 | **Row 1:** Reuses water **Row 2:** Reduces water use **Row 3:** Provides other source of water (1 point) | MS-ESS3-3 | 6. Constructing Explanations and Designing Solutions | ESS3.C Human Impacts on Earth Systems | 2. Cause and Effect | Propose several different processes to monitor and/or minimize the impact of human activity on water supplies. |

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 27 | C (1 point) | MS-ESS1-1 | 2. Developing and Using Models | ESS1.A The Universe and Its Stars | 1. Patterns | Improve a model of the Earth and Moon to show how solar eclipses occur. |
| 28 | C (1 point) | MS-ESS1-2 | 2. Developing and Using Models | ESS1.B Earth and the Solar System | 4. Systems and System Models | Identify the locations of several celestial objects within the solar system, including the Earth, to complete the model. |
| 29 | **First drop-down list:** protein **Second drop-down list:** different from (1 point) | MS-LS3-1 | 2. Developing and Using Models | LS3.A Inheritance of Traits | 6. Structure and Function | Complete an explanation on the effect a gene mutation has on the resulting protein. |
| 30 | produces more (1 point) | MS-LS3-1 | 2. Developing and Using Models | LS3.A Inheritance of Traits | 6. Structure and Function | Complete an explanation on the effect a gene mutation has on the resulting protein and the trait of the organism. |
| 31 | D (1 point) | MS-LS3-2 | 2. Developing and Using Models | LS3.A Inheritance of Traits | 2. Cause and Effect | Explain how the genetic differences could arise from the subset of alleles inherited. |
| 32 | **First drop-down list:** most **Second drop-down list:** over 50% (1 point) | MS-LS4-4 | 6. Constructing Explanations and Designing Solutions | LS4.B Natural Selection | 2. Cause and Effect | Complete an explanation to describe why one variation of a trait is more advantageous in a given environment. |

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|----|----|-----|-----|------|
| 33 | Third and fourth options (1 point) | MS-LS4-4 | 6. Constructing Explanations and Designing Solutions | LS4.B Natural Selection | 2. Cause and Effect | Select the additional data that would be most relevant to helping to interpret the graph. |
| 34 | Exemplars and rubric provided on the next page. | MS-LS4-4 | 6. Constructing Explanations and Designing Solutions | LS4.B Natural Selection | 2. Cause and Effect | Relate the patterns on the graph to the adaptive status of the black allele. |

## Item 34 Exemplars and Rubric

| Score | Exemplar(s) | Rubric |
|---|---|---|
| 2 | The black squirrel population goes up at the start, showing it's helpful, but goes down at the end, showing it's harmful.<br><br>OR<br><br>From 2010 to 2012, the increase in black squirrels show it was a helpful mutation. From 2013 to 2015, the decrease in black squirrels shows that it was a harmful mutation. | The response includes an explanation of how the mutation was helpful—that the percentage of the black squirrels increased from 2010 to 2012.<br><br>AND<br><br>The response includes an explanation of how the mutation was harmful—that the percentage of the black squirrels decreased from 2013 to 2015. |
| 1 | The number of black squirrels increased for part of the time and decreased for part of the time.<br><br>OR<br><br>We know being black was helpful at the beginning because there were more black ones in 2012 than in 2010.<br><br>OR<br><br>After 2013, the decrease in black squirrels showed that the mutation was harmful. | The response includes only one explanation for how the mutation was helpful or harmful.<br><br>OR<br><br>The response only describes a valid pattern but does not explicitly connect the data on the graph to the harm or benefit of the mutation.<br><br>NOTE: Repeating the pattern from the prompt, that the genetic mutation was helpful and harmful is not sufficient. |
| 0 | It's helpful because it helps them survive.<br><br>OR<br><br>It's harmful because it means they will get more eaten.<br><br>OR<br><br>The numbers change when the mutation changes from helpful to harmful.<br><br>OR<br><br>The mutation is sometimes helpful and sometimes harmful because it depends on the color to help them survive.<br><br>OR<br><br>*&YTT%$#$D<br><br>OR<br><br>I don't know; I was never taught this. | 0-point should be awarded if a student attempts to answer the prompt but the response is incorrect or too vague (insufficient information provided) to receive credit.<br><br>A score of 0 should also be given to responses that consist only of:<br>• No relevant content provided<br>   • no response is provided (e.g., blank)<br>   • random keystrokes or nonsense verbiage<br>   • punctuation mark(s) (e.g., ".")<br>• Student's opinion of the test<br>• Direct copy of the stimulus without any attempt to answer<br>• Opinions or comments about random topics<br>• I don't know, IDK (without further elaboration)<br><br>Responses that go on to provide an answer to the prompt should be scored based on the relevant part of the response. |

## Items 35–40

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 35 | B<br><br>(1 point) | MS-PS2-3 | 1. Asking Questions and Defining Problems | PS2.B Types of Interactions | 2. Cause and Effect | Identify questions that will help determine why Car 1 follows the engine. |
| 36 | B<br><br>(1 point) | MS-PS2-3 | 1. Asking Questions and Defining Problems | PS2.B Types of Interactions | 2. Cause and Effect | Identify which question can best be answered by the investigation of why Car 2 is disconnected from Car 1. |
| 37 | **First drop-down list:** 1<br><br>**Second drop-down list:** moving<br><br>(1 point) | MS-PS3-2 | 2. Developing and Using Models | PS3.C Relationship Between Energy and Forces | 4. Systems and System Models | Explain that Car 1 had more kinetic energy when it was closer to the engine because it was moving at that distance. |
| 38 | D<br><br>(1 point) | MS-PS2-5 | 3. Planning and Carrying Out Investigations | PS2.B Types of Interactions | 2. Cause and Effect | Identify the plan that will provide the best evidence for the investigation of why the engine attracts Car 1. |
| 39 | **First drop-down list:** attracted to<br><br>**Second drop-down list:** weaker<br><br>(1 point) | MS-PS3-2 | 2. Developing and Using Models | PS3.A Definitions of Energy | 4. Systems and System Models | Explain that switching the position of Car 2 and Car 3 will cause Car 3 to be attracted to Car 1 and the force will be weaker if they are moved farther apart. |
| 40 | Exemplars and rubric provided on the next page. | MS-PS2-5 | 3. Planning and Carrying Out Investigations | PS2.B Types of Interactions | 2. Cause and Effect | Explain that cars need opposite poles facing each other for there to be an attractive force between the cars. |

## Item 40 Exemplars and Rubric

| Score | Exemplar(s) | Rubric |
|-------|-------------|--------|
| 2 | Car 2 needs a south pole facing Car 1 and Car 2 and 3 need a north and south pole facing each other so they will attract and stay together.<br><br>OR<br><br>Car 2 needs a south end of a magnet and Car 2 and Car 3 should have opposite poles facing each other.<br><br>OR<br><br>Car 2 needs a north pole facing Car 3 so that they attract, and Car 2 needs a south pole facing Car 1 so they attract also. | The response includes that a south pole on Car 2 should be facing Car 1.<br><br>AND<br><br>The response includes that Car 2 and Car 3 must have opposite poles facing each other. |
| 1 | Car 2 needs a south pole facing Car 1.<br><br>OR<br><br>Car 2 and Car 3 need opposite poles that attract each other. | The response includes that a south pole on Car 2 should be facing Car 1.<br><br>OR<br><br>The response includes that Car 2 and Car 3 must have opposite poles facing each other. |
| 0 | Car 2 needs a north end of a magnet on its left side.<br><br>OR<br><br>Car 2 needs to be moved behind Car 3.<br><br>OR<br><br>*&YTT%$#$D<br><br>OR<br><br>I don't know; I was never taught this. | 0-point should be awarded if a student attempts to answer the prompt but the response is incorrect or too vague (insufficient information provided) to receive credit.<br><br>A score of 0 should also be given to responses that consist only of:<br>• No relevant content provided<br>  • no response is provided (e.g., blank)<br>  • random keystrokes or nonsense verbiage<br>  • punctuation mark(s) (e.g., ".")<br>• Student's opinion of the test<br>• Direct copy of the stimulus without any attempt to answer<br>• Opinions or comments about random topics<br>• I don't know, IDK (without further elaboration)<br><br>Responses that go on to provide an answer to the prompt should be scored based on the relevant part of the response. |

## Items 41–46

| Item | Key | PE | SEP | DCI | CCC | ILCS |
|------|-----|-----|-----|-----|-----|------|
| 41 | A<br>(1 point) | MS-ESS2-5 | 3. Planning and Carrying Out Investigations | ESS2.D Weather and Climate | 2. Cause and Effect | Use the data to explain that as air rises, the humidity increases and temperature decreases. |
| 42 | A<br>(1 point) | MS-ESS2-5 | 3. Planning and Carrying Out Investigations | ESS2.D Weather and Climate | 2. Cause and Effect | Use data from the table to predict the weather. |
| 43 | **First drop-down list:** warmer<br>**Second drop-down list:** block cool ocean air<br>(1 point) | MS-ESS2-5 | 3. Planning and Carrying Out Investigations | ESS2.D Weather and Climate | 2. Cause and Effect | Use the information to explain that mountains can affect weather by blocking cool ocean air. |
| 44 | **First drop-down list:** humidity<br>**Second drop-down list:** condensation<br>(1 point) | MS-ESS2-4 | 2. Developing and Using Models | ESS2.C The Roles of Water in Earth's Surface Processes | 5. Energy and Matter | Explain that areas of higher humidity and lower temperature will cause condensation to form. |
| 45 | **First drop-down list:** farther apart<br>**Second drop-down list:** remains a gas<br>(1 point) | MS-PS1-4 | 2. Developing and Using Models | PS1.A Structure and Properties of Matter | 2. Cause and Effect | Use the model to explain that gas particles in a balloon move farther apart and remain a gas as the balloon expands. |
| 46 | Exemplars and rubric provided on the next page. | MS-PS1-4 | 2. Developing and Using Models | PS1.A Structure and Properties of Matter | 2. Cause and Effect | Explain how temperature affects the kinetic energy and speed of the gas particles inside of the balloon. |

## Item 46 Exemplars and Rubric

| Score | Exemplar(s) | Rubric |
|---|---|---|
| 2 | When its hotter the gas moves faster and has more kinetic energy.<br><br>OR<br><br>The particles have more energy so they move faster.<br><br>OR<br><br>Higher temperature will make it so there is more energy for them to move more. | The response includes that the warmer temperature corresponds to higher kinetic energy.<br><br>AND<br><br>The response includes that the warmer temperature corresponds to a higher speed of the gas particles. |
| 1 | The warmer temperature increases the kinetic energy of the gas particles in the balloon.<br><br>OR<br><br>Higher kinetic energy means the speed of gas particles in the balloon are lower.<br><br>OR<br><br>The particles have more speed.<br><br>OR<br><br>There is more energy. | The response includes that the warmer temperature corresponds to higher kinetic energy.<br><br>OR<br><br>The response includes that the warmer temperature corresponds to a higher speed of the gas particles. |
| 0 | The kinetic energy decreases.<br><br>OR<br><br>The speed of gas particles slows down.<br><br>OR<br><br>The speed changes with the energy.<br><br>OR<br><br>*&YTT%$#$D<br><br>OR<br><br>I don't know; I was never taught this. | 0-point should be awarded if a student attempts to answer the prompt but the response is incorrect or too vague (insufficient information provided) to receive credit.<br><br>A score of 0 should also be given to responses that consist only of:<br>• No relevant content provided<br>  • no response is provided (e.g., blank)<br>  • random keystrokes or nonsense verbiage<br>  • punctuation mark(s) (e.g., ".")<br>• Student's opinion of the test<br>• Direct copy of the stimulus without any attempt to answer<br>• Opinions or comments about random topics<br>• I don't know, IDK (without further elaboration)<br><br>Responses that go on to provide an answer to the prompt should be scored based on the relevant part of the response. |