# Computer-Based Released Items
# Grade 5 MCAS Science & Technology/Engineering
# Spring 2025

The spring 2025 5 Science & Technology/Engineering (STE) test was administered in two formats: a computer-based version and a paper-based version. Most students took the computer-based test. The paper-based test was offered as an accommodation for eligible students who were unable to use a computer. More information can be found on the MCAS Test Administration Resources page at www.doe.mass.edu/mcas/admin.html.

The Department of Elementary and Secondary Education is releasing items from both versions of the test to provide information about the knowledge and skills that students are expected to demonstrate.

- Released items from the **computer-based test** are available online at mcas.onlinehelp.cognia.org/released-items.
- Released items from the **paper-based test** are available in PDF format on the Department's website at www.doe.mass.edu/mcas/release.html.

This document provides information about each released item from the *computer-based test*, including the following: reporting category, standard covered, science and engineering practice category covered (if any), item type, item description, and correct answer (for selected-response items only). This information is also provided for unreleased operational items. Sample responses and scoring guidelines for constructed-response items will be posted at www.doe.mass.edu/mcas/student/.

**A Note about Testing Mode**

Most of the operational items on the grade 5 STE test were the same, regardless of whether a student took the computer-based version or the paper-based version. In places where a technology-enhanced item was used on the computer-based test, an adapted version of the item was created for use on the paper test. These adapted paper items were multiple-choice or multiple-select items that tested the same STE content and assessed the same standard as the technology-enhanced item.

## Grade 5 Science & Technology/Engineering
## Spring 2025 Computer-Based Released Operational Items

| CBT Item No. | Reporting Category | Standard | Science and Engineering Practice Categories | Item Type* | Item Description | Correct Answer (SR)** |
|---|---|---|---|---|---|---|
| 1 | *Earth and Space Science* | 4.ESS.1.1 | Evidence, Reasoning, and Modeling | SR | Interpret a diagram to identify the cause of a change in a landscape over time. | *see page 6* |
| 2 | *Life Science* | 3.LS.4.2 | Evidence, Reasoning, and Modeling | SR | Determine which plant has a survival advantage based on its characteristics. | A |
| 3 | *Technology/ Engineering* | 3.ETS.1.2 | Evidence, Reasoning, and Modeling | SR | Analyze two designs to determine a benefit of using one design instead of the other design to solve a problem. | C |
| 4 | *Earth and Space Science* | 3.ESS.2.1 | Mathematics and Data | SR | Analyze climate graphs for two cities to determine which city and month weather data were most likely collected in. | C |
| 5 | *Earth and Space Science* | 4.ESS.2.1 | Evidence, Reasoning, and Modeling | SR | Analyze climate data to identify the cities where two different weather events would most likely occur and the type of erosion that would most likely occur in each city. | *see page 6* |
| 6 | *Earth and Space Science* | 4.ESS.3.1 | Mathematics and Data | SR | Identify that solar energy is renewable and use climate data to explain why more electricity can be generated by solar energy in one city than in another city. | *see page 6* |
| 7 | *Earth and Space Science* | 3.ESS.2.2 | Mathematics and Data | CR | Analyze climate data to compare the temperatures in two cities and describe two ways the climate in one city is different from the climate in the other city. | |
| 8 | *Physical Science* | 4.PS.3.4 | Investigations and Questioning | SR | Analyze a device to determine which change to the device would improve how well it functions. | D |
| 9 | *Physical Science* | 3.PS.2.1 | Evidence, Reasoning, and Modeling | SR | Use a diagram to describe the forces acting on a balloon as it moves in an investigation. | B |
| 10 | *Life Science* | 5.PS.3.1 | Evidence, Reasoning, and Modeling | CR | Identify the original source of energy for an ecosystem and complete a model that represents the flow of energy in the ecosystem. | |
| 11 | *Technology/ Engineering* | 4.ESS.3.2 | Investigations and Questioning | SR | Compare two design solutions to identify an advantage of using one of the solutions, and describe how to determine which material is more effective to use in one of the solutions. | A;D |

| CBT Item No. | Reporting Category | Standard | Science and Engineering Practice Categories | Item Type* | Item Description | Correct Answer (SR)** |
|---|---|---|---|---|---|---|
| 12 | *Physical Science* | 5.PS.1.4 | Investigations and Questioning | SR | Determine which question a student was investigating when making observations before and after a substance was added to a beaker. | C |
| 13 | *Technology/ Engineering* | 5.ETS.3.2 | Evidence, Reasoning, and Modeling | SR | Interpret a diagram to describe the function of a structure in a toy car. | B |
| 14 | *Technology/ Engineering* | 4.PS.4.3 | Evidence, Reasoning, and Modeling | SR | Compare two types of communication to determine an advantage of one type over the other. | D |
| 15 | *Physical Science* | 5.PS.1.1 | Evidence, Reasoning, and Modeling | SR | Use evidence from a video to explain that all matter, including gas, takes up space. | D;A |
| 16 | *Physical Science* | 4.PS.3.2 | Mathematics and Data | SR | Determine which weather condition would cause a wind turbine to produce the most electric energy. | D |
| 17 | *Life Science* | 5.LS.2.2 | Investigations and Questioning | CR | Identify what could be measured to determine how well a composter works and describe changes to the composter to make it work better. | |
| 18 | *Physical Science* | 4.PS.3.1 | Evidence, Reasoning, and Modeling | SR | Use evidence from a diagram to explain why a claim about an object's kinetic energy is incorrect. | D |
| 19 | *Technology/ Engineering* | 3.ESS.3.1 | None | SR | Identify a material that could be used to conduct electricity in a lightning rod. | A |
| 20 | *Life Science* | 3.LS.3.2 | None | SR | Identify traits that offspring would most likely inherit from their parents. | A,B |

* STE item types are selected-response (SR) and constructed-response (CR).
** Answers are provided here for selected-response items only. Page 6 of this document provides correct answers for technology-enhanced (TE) items. Sample responses and scoring guidelines for constructed-response items will be posted at www.doe.mass.edu/mcas/student/default.html.

## Grade 5 Science and Technology/Engineering
## Spring 2025 Unreleased Operational Items

| CBT Item No. | Reporting Category | Standard | Science and Engineering Practice Category | Item Type* | Item Description |
|---|---|---|---|---|---|
| 21 | *Earth and Space Science* | 5.ESS.3.1 | None | SR | Determine the best solution for reducing the amount of waste that ends up in a landfill. |
| 22 | *Earth and Space Science* | 5.ESS.2.2 | Mathematics and Data | SR | Use data to describe the availability of fresh water for drinking. |
| 23 | *Physical Science* | 5.PS.2.1 | Evidence, Reasoning, and Modeling | SR | Determine the direction of the gravitational force acting on an object. |
| 24 | *Physical Science* | 3.PS.2.1 | Evidence, Reasoning, and Modeling | SR | Explain why an object moves at a different speed when a substance is added to the bottom of the object. |
| 25 | *Physical Science* | 4.PS.3.4 | Evidence, Reasoning, and Modeling | SR | Describe the type of energy an object that is not moving has at the top of a hill. |
| 26 | *Physical Science* | 4.PS.3.3 | Evidence, Reasoning, and Modeling | CR | Describe how one form of energy is converted into another form of energy during a collision and analyze data to explain which substance, when added to the bottom of an object, would cause the object to make the loudest noise during a collision. |
| 27 | *Technology/ Engineering* | 4.ETS.1.5 | Evidence, Reasoning, and Modeling | CR | Describe factors that should be considered when deciding on the features of a design and explain the reasoning for using such features. |
| 28 | *Physical Science* | 4.PS.4.2 | Evidence, Reasoning, and Modeling | SR | Determine the model that shows how light travels in order for a person to see an object. |
| 29 | *Life Science* | 3.LS.4.2 | Evidence, Reasoning, and Modeling | SR | Determine which environmental condition would help individuals with a certain fur color to survive. |
| 30 | *Technology/ Engineering* | 3.ETS.1.4 | None | SR | Determine which information would best help a person build a device. |
| 31 | *Life Science* | 5.LS.2.1 | None | SR | Identify the main role of bacteria in the cycling of matter in an ecosystem. |
| 32 | *Technology/ Engineering* | 4.ETS.1.5 | Evidence, Reasoning, and Modeling | SR | Determine which design feature would make an area most accessible to people who use wheelchairs. |
| 33 | *Earth and Space Science* | 4.ESS.2.2 | Evidence, Reasoning, and Modeling | SR | Interpret a map to describe the location of volcanoes. |
| 34 | *Technology/ Engineering* | 5.ETS.3.1 | Evidence, Reasoning, and Modeling | SR | Use information about a design to explain why a feature of the design is an innovation. |

| CBT Item No. | Reporting Category | Standard | Science and Engineering Practice Category | Item Type* | Item Description |
|---|---|---|---|---|---|
| 35 | *Life Science* | 3.LS.4.1 | Evidence, Reasoning, and Modeling | SR | Use fossil evidence to identify the rock layers that contain evidence that the area was once covered by water. |
| 36 | *Earth and Space Science* | 5.ESS.2.1 | Evidence, Reasoning, and Modeling | CR | Identify two steps that are not labeled on a water cycle model and describe what happens to water during each step. |
| 37 | *Earth and Space Science* | 5.ESS.1.2 | None | SR | Identify when a certain moon phase will occur next and describe how long it takes the Moon to orbit Earth. |
| 38 | *Earth and Space Science* | 5.ESS.3.2 | Investigations and Questioning | SR | Determine what to measure to see how well water filters work. |
| 39 | *Life Science* | 5.LS.2.1 | Evidence, Reasoning, and Modeling | SR | Analyze a food web to identify which population would decrease if there were a change to another population, and describe the role of consumers in an ecosystem. |
| 40 | *Life Science* | 3.LS.1.1 | None | SR | Determine when a plant and an animal are going through the same life cycle stage. |
| 41 | *Life Science* | 5.LS.1.1 | Evidence, Reasoning, and Modeling | SR | Identify a model that shows the inputs and outputs of photosynthesis. |

* Science and Technology/Engineering item types are: selected-response (SR) and constructed-response (CR).

**Correct Answer for CBT Item #1: Technology-Enhanced Item**

The hole in the rock most likely formed as a result of
weathering and erosion.

**Correct Answer for CBT Item #5: Technology-Enhanced Item**

| Weather Event | City | Erosion |
|---|---|---|
| a nor'easter with heavy rain and strong winds | Boston | Water carries sand away from beaches. |
| extreme heat and very little rain for months | Phoenix | Land dries up and soil blows away. |

**Correct Answer for CBT Item #6: Technology-Enhanced Item**

The energy resource for solar panels is renewable. The students determine that more electricity can be generated from solar panels in Phoenix because Phoenix has more hours of sunshine than Boston.