MASSACHUSETTS
Department of Elementary
and Secondary Education

Release of Spring 2024 MCAS Test Information

from the

Grade 5 Science and Technology/Engineering Test

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Massachusetts Department of Elementary and Secondary Education

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Department of Elementary
and Secondary Education

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Overview of Grade 5 Science and Technology/Engineering Test

The spring 2024 grade 5 Science and 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.

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.

The Department is not releasing items from the spring 2024 MCAS grades 3–8 tests. Released items from previous years' computer-based test are available on the MCAS Resource Center website at mcas.pearsonsupport.com/released-items.

Test Sessions and Content Overview

The grade 5 STE test was made up of two separate test sessions. Each session included selected-response questions and constructed-response questions. On the paper-based test, the selected-response questions were multiple-choice items and multiple-select items, in which students select the correct answer(s) from among several answer options.

Standards and Reporting Categories

The grade 5 STE test was based on learning standards in the four major content strands in the 2016 *Massachusetts Science and Technology/Engineering Curriculum Framework*. The Framework is available on the Department website at www.doe.mass.edu/frameworks/current.html. The four content strands are listed below.

- Earth and Space Science
- Life Science
- Physical Science
- Technology/Engineering

Science and Technology/Engineering test results are reported under four MCAS reporting categories, which are identical to the four framework content strands listed above.

Most items on the grade 5 STE test are also reported as aligning to one of three MCAS Science and Engineering Practice Categories. The three practice categories are listed below.

- Practice Category A: Investigations and Questioning
- Practice Category B: Mathematics and Data
- Practice Category C: Evidence, Reasoning, and Modeling

More information about the practice categories is available on the Department website at www.doe.mass.edu/mcas/tdd/practice-categories.html.

The tables at the conclusion of this document provide the following information about each operational item: reporting category, standard covered, science and engineering practice category covered (if any), item type, and item description.

Reference Materials

Each student taking the grade 5 STE test was provided with a ruler and a calculator.

During both STE test sessions, the use of authorized bilingual word-to-word dictionaries and glossaries was allowed for students who are currently or were ever reported as English learners.

Grade 5 Science and Technology/Engineering
Spring 2024 Computer-Based Operational Items

CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description
1	*Physical Science*	3.PS.2.4	C. Evidence, Reasoning, and Modeling	SR	Describe how to solve a design problem using magnets.
2	*Physical Science*	4.PS.3.3	B. Mathematics and Data	SR	Analyze data to determine which conditions will produce a louder sound during a collision.
3	*Earth and Space Science*	5.ESS.2.1	A. Investigations and Questioning	SR	Determine which question would be most helpful when investigating a change in the amount of groundwater.
4	*Technology/ Engineering*	3.ETS.1.4	C. Evidence, Reasoning, and Modeling	SR	Determine the best way to represent information about a design solution.
5	*Earth and Space Science*	5.ESS.2.2	C. Evidence, Reasoning, and Modeling	SR	Interpret a map to identify bodies of water that are sources of fresh water.
6	*Technology/ Engineering*	3.ETS.1.2	B. Mathematics and Data	SR	Using information about material properties, determine which material best meets the given criteria.
7	*Technology/ Engineering*	4.PS.4.3	C. Evidence, Reasoning, and Modeling	SR	Evaluate a model to determine that information is received and decoded at one step in a process.
8	*Technology/ Engineering*	3.ETS.1.1	B. Mathematics and Data	SR	Analyze survey results to better define a design problem.
9	*Technology/ Engineering*	4.ETS.1.5	A. Investigations and Questioning	CR	Describe the main purpose of a prototype and use information about a design problem to describe two criteria the prototype must meet.
10	*Life Science*	4.LS.1.1	C. Evidence, Reasoning, and Modeling	CR	Complete a model by labeling plant structures and describe the function of two of those structures.
11	*Physical Science*	4.PS.3.1	B. Mathematics and Data	SR	Use information in a table to order a car's kinetic energy during a trip from least to greatest.
12	*Life Science*	5.PS.3.1	C. Evidence, Reasoning, and Modeling	SR	Describe one way energy moves through a food web and describe how consumers use this energy.
13	*Earth and Space Science*	5.ESS.1.1	None	SR	Explain why the Sun appears brighter than other stars.
14	*Earth and Space Science*	3.ESS.2.1	B. Mathematics and Data	CR	Analyze information from a weather forecast to support an explanation about which day would be best for an outdoor activity.
15	*Physical Science*	4.PS.4.1	C. Evidence, Reasoning, and Modeling	SR	Describe the transfer of energy and regular pattern of motion that occurs as a wave travels.
16	*Life Science*	3.LS.4.4	None	SR	Describe an environmental condition that leads to a change in an animal's behavior.
17	*Physical Science*	4.PS.4.2	None	SR	Describe how light travels in a straight line.
18	*Physical Science*	5.PS.1.3	C. Evidence, Reasoning, and Modeling	SR	Use information about characteristic properties of objects to determine which objects are made of the same material.
19	*Life Science*	5.LS.1.1	A. Investigations and Questioning	SR	Determine the next step in an investigation about the plant structures in which photosynthesis takes place.
20	*Earth and Space Science*	4.ESS.3.1	None	SR	Identify evidence to support a claim that river water is a renewable source of energy.
21	*Life Science*	3.LS.1.1	C. Evidence, Reasoning, and Modeling	SR	Compare life cycle models of a plant and an animal to describe a common characteristic.
22	*Technology/ Engineering*	5.ETS.3.1	C. Evidence, Reasoning, and Modeling	SR	Compare two designs and explain why one design is an innovation.

CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description
23	*Earth and Space Science*	5.ESS.3.2	A. Investigations and Questioning	SR	Describe a change to improve a water filter design.
24	*Physical Science*	3.PS.2.1	C. Evidence, Reasoning, and Modeling	SR	Analyze a diagram and determine the effect of unbalanced forces on an object.
25	*Earth and Space Science*	4.ESS.2.1	C. Evidence, Reasoning, and Modeling	SR	Interpret a diagram to determine which evidence best supports a claim about erosion.
26	*Life Science*	3.LS.4.4	None	SR	Describe how a change to a forest habitat affects a tree's ability to grow.
27	*Life Science*	4.LS.1.1	None	SR	Describe how tree bark helps a tree survive extreme conditions.
28	*Earth and Space Science*	5.ESS.2.1	B. Mathematics and Data	CR	Compare the amount of evaporation in different seasons using climate data and explain why wildfires are more likely to occur in a particular season using climate data.
29	*Technology/ Engineering*	3.ETS.1.2	C. Evidence, Reasoning, and Modeling	SR	Use a ruler to measure a diagram to determine whether a design solution meets all criteria.
30	*Life Science*	3.LS.4.1	C. Evidence, Reasoning, and Modeling	SR	Explain why a fossil of a marine organism may be found in a desert.
31	*Life Science*	5.LS.2.2	None	SR	Describe the effect of adding more bacteria to a composter.
32	*Physical Science*	4.PS.3.2	C. Evidence, Reasoning, and Modeling	CR	Use information from a model to identify a type of energy in a system and describe two types of energy conversions in the system.
33	*Earth and Space Science*	5.ESS.1.2	C. Evidence, Reasoning, and Modeling	CR	Describe how to fix the error in a model showing day and night on Earth and explain the cause of day and night.
34	*Physical Science*	3.PS.2.3	A. Investigations and Questioning	SR	Compare changes to an investigation setup, including magnet orientation and distance, to determine the change in which magnets would repel each other.
35	*Life Science*	3.LS.3.2	C. Evidence, Reasoning, and Modeling	SR	Use evidence from a video of plants growing to determine which plant characteristics are inherited and which are influenced by the environment and determine the expected characteristics of offspring grown from one of the plants.
36	*Technology/ Engineering*	4.ESS.3.2	None	SR	Determine whether several design elements are most appropriate for a house in a location that experiences forest fires or floods.
37	*Physical Science*	5.PS.1.1	None	SR	Describe a characteristic of water after it changes from a solid to a liquid in a beaker.
38	*Earth and Space Science*	4.ESS.2.2	C. Evidence, Reasoning, and Modeling	SR	Describe the pattern of ocean trench locations shown on a map.
39	*Technology/ Engineering*	4.PS.4.3	C. Evidence, Reasoning, and Modeling	SR	Identify the step in the transfer of information that is modeled in a video.
40	*Technology/ Engineering*	3.ESS.3.1	B. Mathematics and Data	SR	Using information from a table, explain why one type of material is a better choice to reduce the damage caused by weather.
41	*Physical Science*	5.PS.1.2	B. Mathematics and Data	SR	Calculate the mass of a new substance that forms when two substances react in a closed system.

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

Grade 5 Science and Technology/Engineering
Spring 2024 Paper-Based Operational Items

PBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description
1	*Physical Science*	3.PS.2.4	C. Evidence, Reasoning, and Modeling	SR	Describe how to solve a design problem using magnets.
2	*Physical Science*	4.PS.3.3	B. Mathematics and Data	SR	Analyze data to determine which conditions will produce a louder sound during a collision.
3	*Earth and Space Science*	5.ESS.2.1	A. Investigations and Questioning	SR	Determine which question would be most helpful when investigating a change in the amount of groundwater.
4	*Technology/ Engineering*	3.ETS.1.4	C. Evidence, Reasoning, and Modeling	SR	Determine the best way to represent information about a design solution.
5	*Earth and Space Science*	5.ESS.2.2	C. Evidence, Reasoning, and Modeling	SR	Interpret a map to identify bodies of water that are sources of fresh water.
6	*Technology/ Engineering*	3.ETS.1.2	B. Mathematics and Data	SR	Using information about material properties, determine which material best meets the given criteria.
7	*Technology/ Engineering*	4.PS.4.3	C. Evidence, Reasoning, and Modeling	SR	Evaluate a model to determine that information is received and decoded at one step in a process.
8	*Technology/ Engineering*	3.ETS.1.1	B. Mathematics and Data	SR	Analyze survey results to better define a design problem.
9	*Technology/ Engineering*	4.ETS.1.5	A. Investigations and Questioning	CR	Describe the main purpose of a prototype and use information about a design problem to describe two criteria the prototype must meet.
10	*Life Science*	4.LS.1.1	C. Evidence, Reasoning, and Modeling	CR	Complete a model by labeling plant structures and describe the function of two of those structures.
11	*Physical Science*	4.PS.3.1	B. Mathematics and Data	SR	Use information in a table to order a car's kinetic energy during a trip from least to greatest.
12	*Life Science*	5.PS.3.1	C. Evidence, Reasoning, and Modeling	SR	Describe one way energy moves through a food web and describe how consumers use this energy.
13	*Earth and Space Science*	5.ESS.1.1	None	SR	Explain why the Sun appears brighter than other stars.
14	*Earth and Space Science*	3.ESS.2.1	B. Mathematics and Data	CR	Analyze information from a weather forecast to support an explanation about which day would be best for an outdoor activity.
15	*Physical Science*	4.PS.4.1	C. Evidence, Reasoning, and Modeling	SR	Describe the transfer of energy and regular pattern of motion that occurs as a wave travels.
16	*Life Science*	3.LS.4.4	None	SR	Describe an environmental condition that leads to a change in an animal's behavior.
17	*Physical Science*	4.PS.4.2	None	SR	Describe how light travels in a straight line.
18	*Physical Science*	5.PS.1.3	C. Evidence, Reasoning, and Modeling	SR	Use information about characteristic properties of objects to determine which objects are made of the same material.
19	*Life Science*	5.LS.1.1	A. Investigations and Questioning	SR	Determine the next step in an investigation about the plant structures in which photosynthesis takes place.
20	*Earth and Space Science*	4.ESS.3.1	None	SR	Identify evidence to support a claim that river water is a renewable source of energy.
21	*Life Science*	3.LS.1.1	C. Evidence, Reasoning, and Modeling	SR	Compare life cycle models of a plant and an animal to describe a common characteristic.
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39	*Technology/ Engineering*	4.PS.4.3	C. Evidence, Reasoning, and Modeling	SR	Identify the step in the transfer of information that is modeled in diagrams.
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