Computer-Based Released Items
Grade 5 MCAS Science and Technology/Engineering
Spring 2023

The spring 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.

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.pearsonsupport.com/released-items. The computer-based released items are collected in a "mini test" called an ePAT (electronic practice assessment tool). Items in the ePAT are displayed in TestNav 8, the testing platform for the computer-based tests.

- 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, and item description. This information is also provided for unreleased operational items. Answers are provided for released selected-response items only. Sample student responses and scoring guides for released 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 and Technology/Engineering
Spring 2023 Computer-Based Released Operational Items

CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description	Correct Answer (SR)**
1	Life Science	5.LS.2.1	C. Evidence, Reasoning, and Modeling	SR	Use a food web to describe how an organism in an ecosystem would be affected if another organism was removed from the ecosystem.	D
2	Earth and Space Science	5.ESS.2.2	B. Mathematics and Data	SR	Interpret a circle graph to explain why there is a limited amount of fresh water available for human use.	*see page 6*
3	Earth and Space Science	4.ESS.3.1	None	SR	Identify renewable and nonrenewable energy resources for a house.	*see page 6*
4	Earth and Space Science	4.ESS.2.2	C. Evidence, Reasoning, and Modeling	SR	Interpret the features of a map to identify where volcanoes and earthquakes are most likely to occur.	*see page 6*
5	Technology/ Engineering	3.ETS.1.4	C. Evidence, Reasoning, and Modeling	CR 3 pts.	Compare two diagrams of a design solution, explain why one diagram is better for building a prototype, and describe design changes given the outcomes from testing the prototype.	
6	Physical Science	4.PS.3.4	A. Investigations and Questioning	SR	Determine how a device can be changed to test how stored energy affects the motion of the device.	D
7	Life Science	5.LS.1.1	A. Investigations and Questioning	CR 2 pts.	Explain why plant height is measured in a certain investigation and explain why one group of plants grew taller than another group in the investigation.	
8	Technology/ Engineering	3.ETS.1.1	A. Investigations and Questioning	SR	Determine the problem a given structure was designed to solve.	D
9	Technology/ Engineering	3.ESS.3.1	None	SR	Describe an important factor to consider in choosing a design solution for a specific design problem.	B
10	Life Science	3.LS.3.1	B. Mathematics and Data	SR	Analyze data to draw a conclusion about the inheritance of a specific trait.	B
11	Life Science	3.LS.4.2	None	SR	Describe how some individuals within a population have an advantage in survival and reproduction because of variations of a characteristic.	C
12	Physical Science	5.PS.1.1	C. Evidence, Reasoning, and Modeling	SR	Analyze information from an investigation to model particle motion before and after two phase changes.	*see page 6*
13	Physical Science	5.PS.1.1	None	SR	Identify a phase change and describe the change in heat energy that caused the phase change.	*see page 6*
14	Physical Science	5.PS.1.3	A. Investigations and Questioning	SR	Determine the measurement or observation that would be most useful in distinguishing between two substances.	C

15	Physical Science	5.PS.1.2	C. Evidence, Reasoning, and Modeling	CR 3 pts.	Explain why the mass of a liquid decreases in an open beaker; determine and explain how closing the beaker will most likely affect the mass of the liquid.	
16	Technology/ Engineering	3.ETS.1.2	C. Evidence, Reasoning, and Modeling	SR	Compare design solutions to determine why one design cooks food faster.	C
17	Earth and Space Science	3.ESS.2.1	B. Mathematics and Data	SR 2 pts.	Use weather data for an area to determine the most likely type of precipitation that will fall and to compare weather conditions at different times.	A;D
18	Earth and Space Science	5.ESS.3.2	C. Evidence, Reasoning, and Modeling	SR	Describe a change to the design of a filter that would improve how the filter functions.	B
19	Earth and Space Science	3.ESS.2.2	None	SR	Identify data that would be helpful when describing different climates.	D
20	Life Science	3.LS.4.4	None	SR	Describe an example of organisms responding to a seasonal change.	C

* STE item types are selected-response (SR) and constructed-response (CR). All selected-response items are worth 1 point unless otherwise noted.

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

Grade 5 Science and Technology/Engineering
Spring 2023 Computer-Based Unreleased Operational Items

CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description
21	Physical Science	5.PS.2.1	None	SR	Identify an action that shows how gravity acts on an object.
22	Life Science	4.LS.1.1	None	SR	Explain why similar structures in two types of animals were different.
23	Life Science	5.PS.3.1	C. Evidence, Reasoning, and Modeling	SR	Complete a model to show the flow of energy through an ecosystem.
24	Life Science	3.LS.4.4	None	SR	Describe how a change in an ecosystem could affect the survival and reproduction of an organism.
25	Life Science	3.LS.3.2	C. Evidence, Reasoning, and Modeling	CR 3 pts.	Identify inherited characteristics of an animal and explain how the characteristics are inherited; identify a characteristic of the animal that is caused by the environment and explain how the characteristic is caused by the environment.
26	Physical Science	3.PS.2.1	None	SR	Explain how friction affects the distance that an object moves.
27	Life Science	3.LS.4.5	C. Evidence, Reasoning, and Modeling	SR 2 pts.	Compare the life cycles of two organisms to identify similarities in their life stages and explain the importance of the adult life stage.
28	Physical Science	4.PS.3.3	None	SR 2 pts.	Identify a type of energy produced during a collision, describe the amount of energy an object has after a collision, and describe how to increase the amount of sound energy produced during a collision.
29	Technology/ Engineering	5.ETS.3.2	C. Evidence, Reasoning, and	SR	Interpret a diagram to describe the purpose of a part of a system.
30	Technology/ Engineering	4.ETS.1.5	A. Investigations and Questioning	SR	Determine how a change to a design feature solved a design problem.
31	Earth and Space Science	4.ESS.1.1	C. Evidence, Reasoning, and Modeling	SR	Interpret a diagram to identify the cause of a change in a landscape over time.
32	Physical Science	5.PS.1.4	C. Evidence, Reasoning, and Modeling	SR	Identify evidence of a chemical reaction in an investigation.
33	Earth and Space Science	5.ESS.3.1	C. Evidence, Reasoning, and Modeling	SR	Use a model of a watershed to determine ways to reduce pollution in a river.
34	Technology/ Engineering	3.ETS.1.1	A. Investigations and Questioning	SR	Select two criteria for success of a design solution.
35	Earth and Space Science	4.ESS.2.1	None	SR	Describe how soil forms through weathering.

36	Physical Science	4.PS.3.1	C. Evidence, Reasoning, and Modeling	SR	Use the evidence from an investigation to compare the sound and kinetic energies of objects before and after collisions.
37	Earth and Space Science	5.ESS.3.1	None	CR 3 pts.	Describe several different ways a school community could help the environment.
38	Technology/ Engineering	3.ESS.3.1	C. Evidence, Reasoning, and Modeling	CR 2 pts.	Identify a weather condition that could cause damage to a roof, describe the damage it could cause, and explain how a certain roof design could prevent this weather damage.
39	Technology/ Engineering	4.PS.4.3	C. Evidence, Reasoning, and Modeling	SR	Determine two types of information transfer that are used to communicate a message.
40	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.
41	Physical Science	4.PS.3.2	None	SR	Use information about a device to determine energy transformations that occur during its operation.

* STE item types are selected-response (SR) and constructed-response (CR). All selected-response items are worth 1 point unless otherwise noted.

Correct Answer for CBT Item #2: Technology-Enhanced Item

Only a small percentage of the fresh water on Earth is available for human use because most fresh water is [frozen in glaciers and ice caps. ⌄]

Correct Answer for CBT Item #3: Technology-Enhanced Item

The house currently uses electricity produced from a [**nonrenewable**] resource.
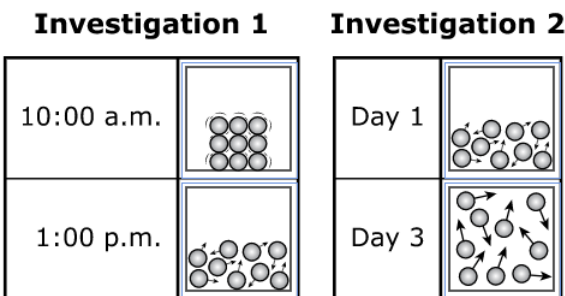
Sunlight is an example of a [**renewable**] resource.

Wind is an example of a [**renewable**] resource.

Correct Answer for CBT Item #4: Technology-Enhanced Item

Location [Y ⌄] is more likely to experience earthquakes and volcanoes than

the other locations because most earthquakes and volcanoes occur

[along plate boundaries. ⌄]

Correct Answer for CBT Item #12: Technology-Enhanced Item

Investigation 1

10:00 a.m.	
1:00 p.m.	

Investigation 2

Day 1	
Day 3	

Correct Answer for CBT Item #13: Technology-Enhanced Item

The ice in the beaker [melted ⌄] into water. This change occurred

because the ice [gained heat energy. ⌄]