Computer-Based Released Items
Grade 5 MCAS Science and Technology/Engineering
Spring 2022

The spring 2022 grade 5 Science and Technology/Engineering (STE) test was administered in two primary formats: a computer-based version and a paper-based version. The vast majority of students took the computer-based test. The paper-based test was offered as an accommodation for students with disabilities who are unable to use a computer, as well as for English learners who are new to the country and are unfamiliar with technology.

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 at mcas.pearsonsupport.com/released-items/. The computer-based released items are 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 on the Department's website at www.doe.mass.edu/mcas/release.html.

This document provides information about each released and unreleased item from the *computer-based test*, including reporting category, standard covered, practice category covered (if any), item type, and item description. Answers are provided for released selected-response items only. Sample student responses and scoring guides for constructed-response items will be posted 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 2022 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	3.LS.3.1	None	SR	Describe how traits are inherited from a mother and a father.	C
2	Technology/ Engineering	4.PS.4.3	None	SR	Determine that changing characters into a code is an example of encoding.	B
3	Life Science	3.LS.4.1	C. Evidence, Reasoning, and Modeling	SR	Use fossil evidence to support a claim that an organism once lived on land.	D
4	Earth and Space Science	5.ESS.1.2	C. Evidence, Reasoning, and Modeling	SR	Complete a model that shows where a person on Earth would be experiencing night.	*see page 6*
5	Technology/ Engineering	3.ETS.1.4	None	SR 2 pt.	Determine the information needed to solve a design problem and identify that a prototype should be used to test the design solution.	C;C
6	Life Science	3.LS.4.4	B. Mathematics and Data	SR	Interpret data to explain how reducing the sunlight in an area will affect a type of organism living there.	B
7	Technology/ Engineering	5.ETS.3.1	C. Evidence, Reasoning, and Modeling	SR	Distinguish between an innovation and an invention given descriptions of two technologies.	B
8	Physical Science	4.PS.4.2	C. Evidence, Reasoning, and Modeling	SR	Complete a model to show how light reflects off an object and enters an eye in order for the object to be seen.	*see page 6*
9	Technology/ Engineering	4.ETS.1.3	C. Evidence, Reasoning, and Modeling	SR	Analyze a data table to determine which material should be used in a design solution to meet the criteria.	A
10	Earth and Space Science	3.ESS.2.2	B. Mathematics and Data	SR	Interpret seasonal climate data to describe the climate of an area.	D
11	Earth and Space Science	5.ESS.3.1	C. Evidence, Reasoning, and Modeling	SR	Compare two design solutions to determine which is more effective at reducing human impact on the local environment.	C
12	Physical Science	5.PS.1.1	C. Evidence, Reasoning, and Modeling	SR	Complete a particle model to show the phase change from a gas to a liquid.	*see page 6*
13	Earth and Space Science	5.ESS.2.1	C. Evidence, Reasoning, and Modeling	CR 3 pt.	Analyze climate data to compare the amount of water that becomes groundwater during different seasons and explain how two design solutions affect the amount of groundwater in an area.	
14	Physical Science	3.PS.2.1	C. Evidence, Reasoning, and Modeling	SR	Complete a model to show the forces acting on an object that is not moving.	*see page 6*

15	Physical Science	3.PS.2.3	C. Evidence, Reasoning, and Modeling	CR 3 pt.	Determine the orientation of magnets in an investigation, the result of replacing one magnet with a block of iron, and an energy conversion that takes place.	
16	Life Science	4.LS.1.1	C. Evidence, Reasoning, and Modeling	CR 2 pt.	Identify a trait that helps provide camouflage to an organism and describe how another trait helps the organism survive in its environment.	
17	Earth and Space Science	4.ESS.3.1	None	SR 2 pt.	Identify that the energy and fuels humans use comes from natural resources and distinguish between renewable and nonrenewable energy sources.	Part A: C Part B: *see page 7*
18	Physical Science	5.PS.1.2	B. Mathematics and Data	SR	Complete a model to show the mass of a substance after a phase change.	*see page 7*
19	Life Science	3.LS.1.1	B. Mathematics and Data	SR	Draw a conclusion from information about the life cycles of four animals.	A
20	Technology/ Engineering	3.ESS.3.1	None	SR	Determine which design solution will work best for a given situation.	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. Pages 6 and 7 of this document provide 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 2022 Computer-Based Unreleased Operational Items

| CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description
21	Life Science	3.LS.4.2	C. Evidence, Reasoning, and Modeling	SR	Determine which plant has a survival advantage based on its characteristics.
22	Physical Science	4.PS.3.1	B. Mathematics and Data	SR	Identify the position at which a person has the greatest kinetic energy based on the person's speed.
23	Earth and Space Science	3.ESS.2.2	B. Mathematics and Data	SR	Interpret climate data to classify different climate regions.
24	Technology/ Engineering	3.ESS.3.1	C. Evidence, Reasoning, and Modeling	SR	Identify which design solutions will reduce the impact of weather on a structure.
25	Technology/ Engineering	4.ETS.1.3	A. Investigations and Questioning	SR	Describe how to improve a test of a design feature to identify failure points.
26	Physical Science	3.PS.2.4	C. Evidence, Reasoning, and Modeling	SR	Analyze a diagram to determine the correct orientation of a magnet for a design solution.
27	Technology/ Engineering	3.ETS.1.2	C. Evidence, Reasoning, and Modeling	CR 3 pt.	Evaluate different designs using a list of criteria and constraints to determine whether each design meets the design requirements.
28	Life Science	5.LS.2.2	A. Investigations and Questioning	CR 3 pt.	Identify what could be measured to determine how well a composter works and describe changes to the composter to make it work better.
29	Physical Science	4.PS.4.1	C. Evidence, Reasoning, and Modeling	SR 2 pt.	Describe the transfer of energy and regular pattern of motion that occurs as a wave travels.
30	Physical Science	4.PS.3.3	B. Mathematics and Data	CR 2 pt.	Analyze data to determine in which collision an object had the greatest change in energy and describe how energy was converted during the collision.
31	Earth and Space Science	5.ESS.3.1	B. Mathematics and Data	SR	Analyze data to determine how a farmer could conserve water.
32	Life Science	5.LS.2.1	None	SR	Identify the main role of bacteria in the cycling of matter in an ecosystem.
33	Life Science	5.PS.3.1	None	SR	Describe how food contains the energy and nutrients that animals need to survive.
34	Earth and Space Science	4.ESS.2.1	None	SR	Interpret a diagram to determine how a rock is being weathered.
35	Life Science	5.LS.1.1	A. Investigations and Questioning	SR	Determine the environmental conditions students should observe in an investigation about plant growth.
36	Physical Science	4.PS.3.2	None	SR	Interpret a scenario to determine what form of energy is transferred.

37	Earth and Space Science	5.ESS.2.2	B. Mathematics and Data	SR	Explain why a bar graph about the different sources of fresh water and salt water on Earth should be revised.
38	Technology/ Engineering	3.ETS.1.4	None	SR	Identify the best representation to help a person replicate a design solution.
39	Earth and Space Science	4.ESS.1.1	None	SR	Determine that weathering and erosion played a role in the formation of a landscape.
40	Earth and Space Science	5.ESS.3.2	A. Investigations and Questioning	SR	Determine what to measure to see how well water filters work.
41	Life Science	3.LS.4.1	C. Evidence, Reasoning, and Modeling	SR	Explain how a fossil of a marine organism may be found in a desert.

* STE item types are selected-response (SR) and constructed-response (CR). All selected-response items are worth 1 point unless otherwise noted.
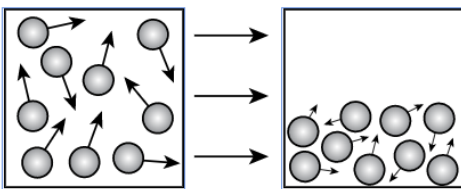
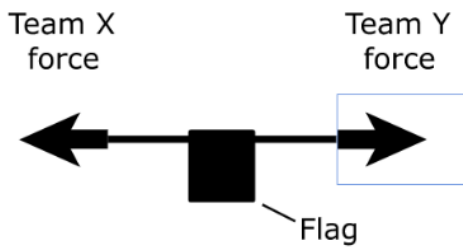**Correct Answer for CBT Item #4: Technology-Enhanced Item**
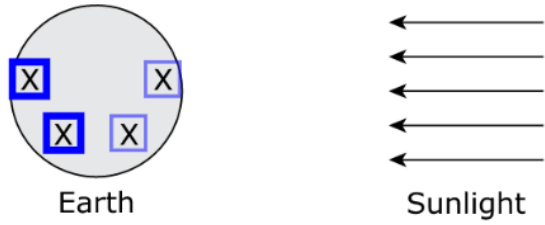
Correct Answer for CBT Item #8: Technology-Enhanced Item
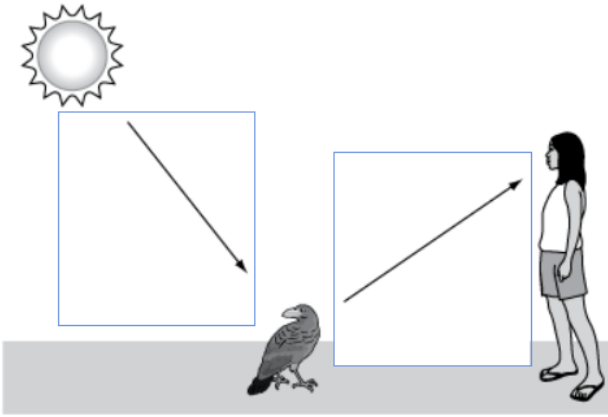
Correct Answer for CBT Item #12: Technology-Enhanced Item

Correct Answer for CBT Item #14: Technology-Enhanced Item

Correct Answer for CBT Item #17 Part B: Technology-Enhanced Item

Renewable		Nonrenewable	
wind	ocean tides	natural gas	coal

Correct Answer for CBT Item #18: Technology-Enhanced Item