

## **Computer-Based Released Items**

### **Grade 8 MCAS Science & Technology/Engineering**

### **Spring 2025**

The spring 2025 grade 8 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](http://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](http://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](http://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/](http://www.doe.mass.edu/mcas/student/).

#### **A Note about Testing Mode**

Most of the operational items on the grade 8 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 8 Science & Technology/Engineering**  
**Spring 2025 Computer-Based Released Operational Items**

CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description	Correct Answer (SR)**
1	<i>Physical Science</i>	6.PS.4.1	Evidence, Reasoning, and Modeling	SR	Interpret models of waves to compare their energies.	A
2	<i>Earth and Space Science</i>	8.ESS.3.1	Evidence, Reasoning, and Modeling	SR	Explain why two locations can have different amounts of fossil fuel resources.	D
3	<i>Technology/Engineering</i>	6.ETS.1.1	Investigations and Questioning	SR	Analyze data to determine the most important criteria for evaluating a solution to a design problem.	D
4	<i>Earth and Space Science</i>	8.ESS.2.5	Evidence, Reasoning, and Modeling	SR	Interpret a diagram to describe how the weather will change in a location as two air masses interact.	<i>see page 6</i>
5	<i>Life Science</i>	7.LS.2.2	Evidence, Reasoning, and Modeling	SR	Interpret a food web to determine the ecological relationships among organisms in an ecosystem.	<i>see page 6</i>
6	<i>Life Science</i>	7.LS.2.3	Evidence, Reasoning, and Modeling	SR	Interpret a food web to identify a producer, a primary consumer, and a secondary consumer in an ecosystem.	<i>see page 6</i>
7	<i>Life Science</i>	7.LS.2.1	Mathematics and Data	SR	Analyze a graph to describe how a population changed over time.	<i>see page 6</i>
8	<i>Life Science</i>	8.LS.4.4	Evidence, Reasoning, and Modeling	CR	Explain how a certain characteristic helps an animal survive, and explain how a population is expected to change due to natural selection as the environment changes.	
9	<i>Physical Science</i>	8.PS.2.2	Mathematics and Data	CR	Analyze data to complete a model showing the strength and direction of forces acting on a block, and explain how two blocks can have different speeds when pushed with the same amount of force.	
10	<i>Physical Science</i>	7.PS.3.2	Evidence, Reasoning, and Modeling	SR	Analyze a diagram to identify which object has the greatest gravitational potential energy (GPE), and explain why the GPE of one object is different than the GPE of a second object.	C;A
11	<i>Physical Science</i>	7.PS.2.5	Evidence, Reasoning, and Modeling	SR	Explain why one object moves when another object is moved closer to it.	D
12	<i>Life Science</i>	8.LS.3.4	Evidence, Reasoning, and Modeling	SR	Analyze Punnett squares to identify which one can be used to determine the probability of a trait for a given cross.	A

CBT Item No.	Reporting Category	Standard	Science and Engineering Practice Category	Item Type*	Item Description	Correct Answer (SR)**
13	<i>Earth and Space Science</i>	8.ESS.3.5	Mathematics and Data	SR	Use a graph to determine changes in carbon dioxide levels in the atmosphere and identify several activities that have contributed to these changes.	B,C,E
14	<i>Technology/Engineering</i>	7.ETS.1.4	Mathematics and Data	SR	Interpret data to describe how to improve a communication system.	<i>see page 6</i>
15	<i>Earth and Space Science</i>	6.ESS.1.1	None	SR	Determine the cause of the Moon's phases, and identify what occurs during one cycle of the Moon's phases.	D;B
16	<i>Earth and Space Science</i>	6.ESS.1.5	Evidence, Reasoning, and Modeling	SR	Describe how a student could build a model that would best represent a galaxy.	D
17	<i>Technology/Engineering</i>	7.ETS.3.4	Evidence, Reasoning, and Modeling	CR	Identify live loads, tension forces, and compression forces in a system and describe how those forces act on the system.	
18	<i>Technology/Engineering</i>	8.ETS.2.5	None	SR	Determine the finishing step in the manufacturing process of a product.	D
19	<i>Earth and Space Science</i>	6.ESS.1.4	Evidence, Reasoning, and Modeling	SR	Analyze a diagram to determine the youngest rock layer that was present when a fault formed.	<i>see page 7</i>
20	<i>Physical Science</i>	7.PS.3.5	Evidence, Reasoning, and Modeling	SR	Describe how the kinetic energy of an object changes in a given scenario.	A

\* STE item types are selected-response (SR) and constructed-response (CR).

\*\* Answers are provided here for selected-response items only. Pages 6–7 of this document provide 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](http://www.doe.mass.edu/mcas/student/default.html).

**Grade 8 Science and Technology/Engineering**  
**Spring 2025 Unreleased Operational Items**

<b>CBT Item No.</b>	<b>Reporting Category</b>	<b>Standard</b>	<b>Science and Engineering Practice Category</b>	<b>Item Type*</b>	<b>Item Description</b>
21	<i>Life Science</i>	6.LS.4.2	Evidence, Reasoning, and Modeling	SR	Describe evidence that supports a close evolutionary relationship between an extinct species and a living species.
22	<i>Earth and Space Science</i>	6.ESS.2.3	Evidence, Reasoning, and Modeling	SR	Determine a geologic feature of a model that provides evidence of Earth's plates spreading apart.
23	<i>Earth and Space Science</i>	6.ESS.1.4	Evidence, Reasoning, and Modeling	SR	Interpret a diagram to identify the relative ages of rock layers.
24	<i>Physical Science</i>	6.PS.1.7	Evidence, Reasoning, and Modeling	SR	Explain why a tectonic plate sinks below another plate.
25	<i>Earth and Space Science</i>	8.ESS.2.1	Evidence, Reasoning, and Modeling	CR	Describe a similarity in how two types of geologic features formed and explain how each feature formed.
26	<i>Physical Science</i>	7.PS.3.6	Evidence, Reasoning, and Modeling	CR	Determine whether radiation, conduction, or convection are occurring in different parts of a model and explain the reasoning.
27	<i>Technology/Engineering</i>	7.ETS.1.2	Evidence, Reasoning, and Modeling	SR	Evaluate a decision matrix to determine which design best meets the criteria.
28	<i>Earth and Space Science</i>	8.ESS.1.2	Mathematics and Data	SR	Determine the data needed to calculate the gravitational force between two objects.
29	<i>Earth and Space Science</i>	8.ESS.2.6	Evidence, Reasoning, and Modeling	SR	Interpret a map to explain temperature differences between two cities.
30	<i>Life Science</i>	8.LS.4.5	None	SR	Describe how artificial selection can be used to produce offspring with a desired trait.
31	<i>Technology/Engineering</i>	7.ETS.3.3	Evidence, Reasoning, and Modeling	SR	Determine the best solution to improve a transportation system.
32	<i>Life Science</i>	6.LS.1.2	Evidence, Reasoning, and Modeling	SR	Determine the location on a student's cell model where genes should be added.
33	<i>Technology/Engineering</i>	7.ETS.3.5	None	SR	Determine the output of a communication system.
34	<i>Physical Science</i>	6.PS.1.6	Investigations and Questioning	SR	Identify the evidence that an exothermic reaction occurred in an investigation.

<b>CBT Item No.</b>	<b>Reporting Category</b>	<b>Standard</b>	<b>Science and Engineering Practice Category</b>	<b>Item Type*</b>	<b>Item Description</b>
35	<i>Life Science</i>	7.LS.2.4	Investigations and Questioning	SR	Analyze a food web to identify what data should be measured to determine how the introduction of a species would impact another organism in the ecosystem.
36	<i>Life Science</i>	6.LS.1.3	None	CR	Identify a body system that interacts with the respiratory system and describe how body cells use oxygen.
37	<i>Physical Science</i>	6.PS.1.7	Evidence, Reasoning, and Modeling	SR	Explain why a certain liquid in a container separates into layers.
38	<i>Physical Science</i>	8.PS.1.1	Evidence, Reasoning, and Modeling	SR	Compare the properties of two molecules by interpreting models of the molecules.
39	<i>Technology/Engineering</i>	7.ETS.3.2	None	SR	Describe the benefits and drawbacks of using one communication system instead of a different communication system.
40	<i>Life Science</i>	8.LS.1.7	None	SR	Identify a similarity among different types of food molecules.
41	<i>Technology/Engineering</i>	6.ETS.2.2	Investigations and Questioning	SR	Determine the most important properties for a material that will be used in a design.

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

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

As the air masses interact, the air in the city will become  and the skies above the city will become

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

The Canada lynx has a  relationship with the red fox.

The red fox has a  relationship with the snowshoe hare.

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

Organism	Producer	Primary Consumer	Secondary Consumer
Canada lynx	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
white spruce	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
snowshoe hare	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

**Correct Answer for CBT Item #7: Technology-Enhanced Item**

The Canada lynx population peaks about every  years. These peaks are most likely caused by

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

Based on the information, the town should add new cell towers so that all neighborhoods are  from a cell tower.

**Correct Answer for CBT Item #19: Technology-Enhanced Item**

