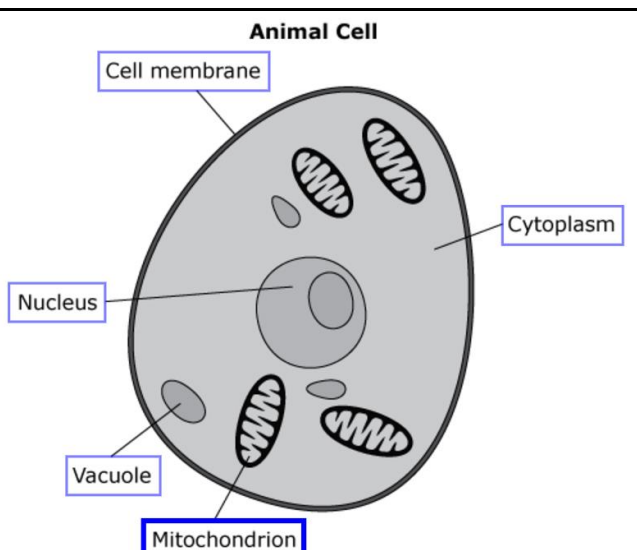
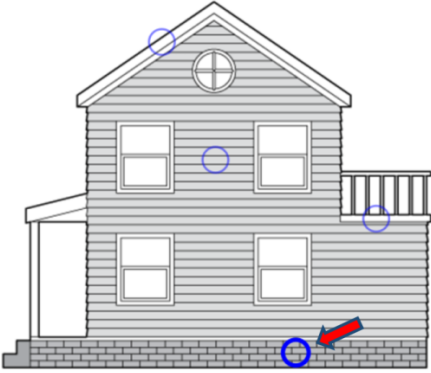
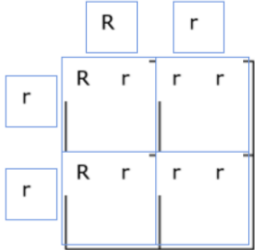
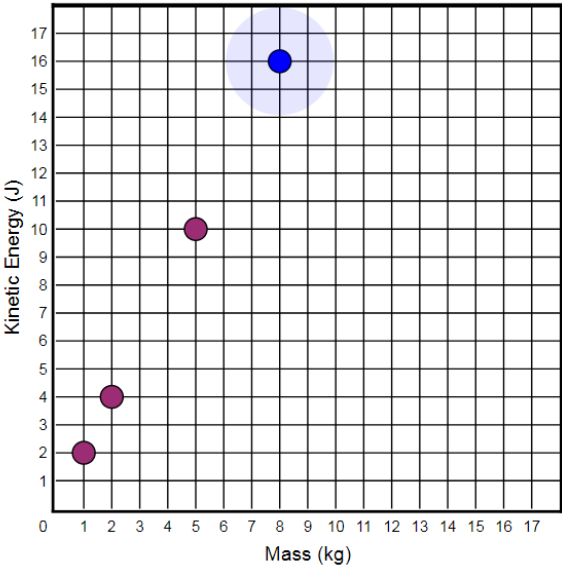


## 2017-18 MCAS Grade 8 Science & Tech/Eng Computer-based Practice Test Answer Key

In June 2017, grade 8 students participated in a voluntary question tryout with new question types aligned to the standards in the [2016 Massachusetts Science and Technology/Engineering Curriculum Framework](#). Questions from the tryout are part of this practice test. To allow for more familiarity with the new question types that will be on the Next Generation tests, this practice test has a much larger percentage of technology enhanced questions compared to the operational MCAS test. More information about test designs can be found [here](#).

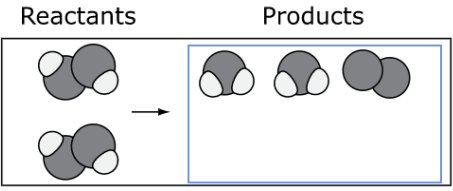
Below is an answer key with the reporting category, standard alignment, and correct answer for each question on the practice test. In addition, student response samples for the constructed response items are provided.

Item Number	Reporting Category	2016 Standard	Practice	Correct Answer
1	Life Science	6.MS-LS1-2	Evidence, Reasoning, & Modeling	<p style="text-align: center;"><b>Animal Cell</b></p> 
2	Technology/Engineering	6.MS-ETS2-1 (MA)	Mathematics & Data	The manufacturer should use <input type="text" value="copper"/> for the bottom of the pan and <input type="text" value="stainless steel"/> for the handle.
3	Earth & Space Science	6.MS-ESS1-4	Evidence, Reasoning, & Modeling	Oldest <input type="text" value="W"/> → <input type="text" value="Y"/> → <input type="text" value="X"/> → <input type="text" value="Z"/> Youngest
4	Life Science	7.MS-LS2-2	Evidence, Reasoning, & Modeling	<div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid gray; padding: 5px; width: 45%;"> <p style="text-align: center; margin-bottom: 5px;">Predatory Relationship</p> <div style="border: 1px solid blue; padding: 2px; margin-bottom: 5px; display: inline-block;">zooplankton &amp; menhaden</div> <div style="border: 1px solid blue; padding: 2px; margin-bottom: 5px; display: inline-block;">osprey &amp; striped bass</div> </div> <div style="border: 1px solid gray; padding: 5px; width: 45%;"> <p style="text-align: center; margin-bottom: 5px;">Competitive Relationship</p> <div style="border: 1px solid blue; padding: 2px; margin-bottom: 5px; display: inline-block;">tern &amp; striped bass</div> </div> </div>

Item Number	Reporting Category	2016 Standard	Practice	Correct Answer											
5	Technology/ Engineering	7.MS-ETS3-4 (MA)	Evidence, Reasoning, & Modeling	Part A											
				Part B	B										
6	Life Science	8.MS-LS3-4 (MA)	Mathematics & Data	Part A											
				Part B	C										
7	Earth & Space Science	8.MS-ESS1-2	No practice	<p>The ocean tides in Massachusetts are primarily caused by <input type="text" value="gravity"/> from <input type="text" value="the Moon and the Sun"/>.</p>											
8	Physical Science	7.MS-PS3-1	Mathematics & Data	<p style="text-align: center;"><b>Kinetic Energy of an Object</b></p>  <table border="1" style="margin-top: 10px;"> <caption>Data points from the Kinetic Energy graph</caption> <thead> <tr> <th>Mass (kg)</th> <th>Kinetic Energy (J)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>2</td> </tr> <tr> <td>2</td> <td>4</td> </tr> <tr> <td>5</td> <td>10</td> </tr> <tr> <td>8</td> <td>16</td> </tr> </tbody> </table>		Mass (kg)	Kinetic Energy (J)	1	2	2	4	5	10	8	16
Mass (kg)	Kinetic Energy (J)														
1	2														
2	4														
5	10														
8	16														

Item Number	Reporting Category	2016 Standard	Practice	Correct Answer
9	Earth & Space Science	6.-MS-ESS1-5 (MA)	Evidence, Reasoning, & Modeling	
10	Technology/Engineering	6.MS-ETS1-5 (MA)	Mathematics & Data	<p>Additional acceptable responses: 500 cm, 0.005 km</p>
11	Earth & Space Science	6.MS-ESS1-1a	Evidence, Reasoning, & Modeling	
12	Life Science	6.MS-LS1-3	No practice	<p>1. The <input type="text" value="digestive"/> system breaks down the apple into usable molecules.</p> <p>2. The <input type="text" value="respiratory"/> system brings in oxygen from the environment.</p> <p>3. The <input type="text" value="circulatory"/> system delivers the usable molecules and oxygen to the cells.</p> <p>4. The cells perform <input type="text" value="cellular respiration"/>.</p>
13	Technology/Engineering	7.MS-ETS3-1 (MA)	Evidence, Reasoning, & Modeling	<p>Source: <input type="text" value="keyboard"/></p> <p>Encoder: <input type="text" value="laptop's processor"/></p> <p>Transmitter: <input type="text" value="Wi-Fi"/></p> <p>Receiver: <input type="text" value="phone"/></p>
14	Life Science	8.MS-LS1-5	Mathematics & Data	<p>See scoring guide and sample student responses below. (Maximum of 2 points)</p>

**Module:** Students read about a scientific scenario or phenomenon and then answered three 1-point questions and one constructed response question worth 3 points.

Item Number	Reporting Category	2016 Standard	Practice	Correct Answer
15	Physical Science	8.MS-PS1-2	Mathematics & Data	B, C
16	Physical Science	8.MS-PS1-5	Evidence, Reasoning, & Modeling	
17	Physical Science	6.MS-PS1-6	Evidence, Reasoning, & Modeling	D
18	Physical Science	8.MS-PS1-2	Mathematics & Data	See scoring guide and sample student responses below. (Maximum of 3 points)

**Question 14: Scoring Guide**

Score	Description
2	The response demonstrates a thorough understanding of how environmental and genetic factors influence the growth of organisms. The response correctly identifies one characteristic of the pea plants that was mainly influenced by genetics and clearly supports the answer with evidence. The response correctly identifies one characteristic of the pea plants that was influenced by both genetics and the environment and clearly supports the answer with evidence.
1	The response demonstrates a partial understanding of how environmental and genetic factors influence the growth of organisms.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No Response

**Question 14: Sample Student Responses (Actual Student Responses)**

Score	Part	Student Response
2	A	The color of the plant was mainly influenced by genetics. It doesn't change, even when fertilizer is added. The colors are still 75% purple and 25% white.
	B	The height of the flowers was influenced by both the environment because their natural height was 10-20 cm tall, but when the fertilizer is added, their height increases to an average of 15-30 cm. This means they were naturally up to 20 cm, but the environment (fertilizer) added extra height.
1	A	one characteristic that was mainly influenced by genetics is the flower color this is because no matter if it was planted with fertilizer or without, the plant color was 75% purple and 25% white. this was not not an acquired trait, but an inherited trait from genetics.
	B	one characteristic of the pea plants that was influenced by both genetics and the environment is the number of plants. this is because there were 500 plants on each side meaning that genetics produced one plant per seed and the environment kept them all alive.
0	A	The color of the plants are just like Mendel experiments but his was based on height. There is a dominant allele in there because 75% of them were purple so the dominant trait is purple or PP.
	B	The place where the plants are is a very good place for growing flowers and the environment helps these plants thrive in their area. Both plants where between 10-30 cm tall and they where both 75% purple and 25% white

**Question 18: Scoring Guide**

Score	Description
3	The response demonstrates a thorough understanding of how to analyze data on the properties of substances and how atoms are rearranged in a chemical reaction. The response correctly identifies the three characteristics that can be used to support the claim that iron and rust are different substances. The response clearly explains why the three properties and the model help support the claim.
2	The response demonstrates a partial understanding of how to analyze data on the properties of substances and how atoms are rearranged in a chemical reaction.
1	The response demonstrates a minimal understanding of how to analyze data on the properties of substances and how atoms are rearranged in a chemical reaction.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

**Question 18: Sample Student Responses (Actual Student Responses)**

Score	Part	Student Response
3	A	One can see that the two substances are different because the density is different. Density never changes if the substance stays the same. Another change that shows iron and rust are different substances is that iron is magnetic and rust is not. The last piece of evidence showing that rust and iron are different substances is that the melting point of rust is higher than that of iron.
	B	The melting points, densities, and magnetism of rust and iron being different shows that the two are different substances. This is because these three characteristics always stay the same, as long as the substance doesn't change. The other measurements listed (mass and temperature) change depending on the amount of the substance you have and the environment you are in.
	C	Iron and rust have chemical makeups that differ greatly. Iron has no oxygen in it, but rust has 3 oxygen atoms per molecule. Also, the shape of the molecules are completely different.
2	A	Iron and rust are different substances because they have different melting points, different densities, and difference in magnetism.
	B	The characters identified in Part A help to support the claim that iron and rust are different substances because all substances have defined chemical properties such as melting point, density, and magnetism despite the amount of that substance. For this to vary in the chart shows that the two are different substances.
	C	Based on the model, the two substances are different because iron is a solid whose atoms are neatly organized, while oxygen is a substance whose atoms are not neatly arranged which shows that it is a gas.
1	A	Density, magnetic, mass
	B	If the three characteristics were the same, then the substances would also likely be the same. These characteristics help identify substances, which is how I know that they are different.
	C	They are different because the model shows that iron is an element, and rust is a compound of iron and oxygen, making different substances.
0	A	temperature melting point mass
	B	because they all have to do with chemical change
	C	they are made up of different things