

## MCAS Grade 8 Science & Technology/Engineering (STE) Paper-based Practice Test Answer Key

The practice test is approximately equal to the number of questions students experience in a single session of the MCAS Grade 8 STE test. Information about the test design is posted [here](#).

The following pages include the reporting category, [standard alignment](#), and practice (if applicable) for each question on the practice test. An answer is also provided for each selected-response item. A rubric and sample student responses are included for constructed-response items.

Item Number	Reporting Category	2016 Standard	Practice	Correct Answer and Number of Points
1	Life Science	7.MS-LS2-2	Evidence, Reasoning, & Modeling	B (1 point)
2	Earth & Space Science	8.MS-ESS1-1b	Evidence, Reasoning, & Modeling	A (1 point)
3	Life Science	6.MS-LS1-2	Evidence, Reasoning, & Modeling	C (1 point)
4	Earth & Space Science	6.MS-ESS1-1a	Evidence, Reasoning, & Modeling	A (1 point)
5	Technology/Engineering	6.MS-ETS1-5 (MA)	Mathematics & Data	See scoring guide and sample student responses below. (Maximum of 2 points)
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 and Number of Points
6	Physical Science	8.MS-PS1-2	Mathematics & Data	B, C (1 point)
7	Physical Science	8.MS-PS1-5	Evidence, Reasoning, & Modeling	C (1 point)
8	Physical Science	6.MS-PS1-6	Evidence, Reasoning, & Modeling	D (1 point)
9	Physical Science	8.MS-PS1-2	Mathematics & Data	See scoring guide and sample student responses below. (Maximum of 3 points)





**Question 9: 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.

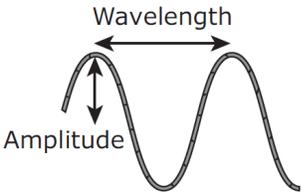
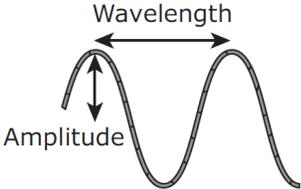
**Question 9: Sample Student Responses (Actual Student Responses)**

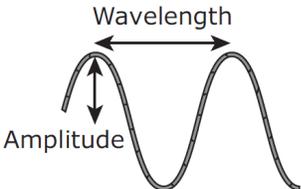
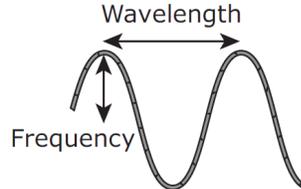
Score	Part	Student Response
3	A	One can see that the two substances are different because the density is different. Density never changes if the substance stays the same. Another change that shows iron and rust are different substances is that iron is magnetic and rust is not. The last piece of evidence 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

**Question 13: Scoring Guide**

Score	Description
3	The response demonstrates a thorough understanding that a wave has a specific pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave. The response correctly labels the wavelength and frequency of a wave in a diagram. The response clearly describes how the student's hand motion could be changed to make a wave with a greater frequency. The response clearly describes how the student's hand motion could be changed to make a wave that carries more energy in each wavelength.
2	The response demonstrates a partial understanding that a wave has a specific pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave.
1	The response demonstrates a minimal understanding of using a diagram of a simple wave to explain that a wave has a specific pattern with a specific amplitude, frequency, and wavelength, and the amplitude of a wave is related to the energy of the wave.
0	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

**Question 13: Sample Student Responses (Actual Student Responses)**

Score	Part	Student Response
3	A	
	B	The student could move the rope back and forth faster than he/she was before.
	C	The student could move the rope back and forth but higher than he/she was doing it before. This will make it so the amplitude of the wave is larger.
2	A	
	B	If the student moves it faster
	C	The student's hand motion could be changed to carry more energy if moved the opposite way possibly

Score	Part	Student Response
1	A	©  <p>The diagram shows a sinusoidal wave. A horizontal double-headed arrow above the wave is labeled 'Wavelength', spanning from one peak to the next. A vertical double-headed arrow to the left of the wave is labeled 'Amplitude', spanning from the equilibrium line to the peak.</p>
	B	The student could have made different motions with his hands. He could have moved the rope very fast or slow. If the student moves it fast the wave could be smaller.
	C	He could have changed the speed of the hand motions.
0	A	①  <p>The diagram shows a sinusoidal wave. A horizontal double-headed arrow above the wave is labeled 'Wavelength', spanning from one peak to the next. A vertical double-headed arrow to the left of the wave is labeled 'Frequency', spanning from the equilibrium line to the peak.</p>
	B	The student would increase how forcefully s/he moves their hand back and forth.
	C	If you do the strokes back and forth forceful and small, each wave is going to have more energy.

### Question 18: 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.

### Question 18: 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 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 were between 10-30 cm tall and they were both 75% purple and 25% white