



Biology

Short Constructed Response Scoring Guide

Spring 2023

General Information

Beginning with the 2022–2023 school year, science assessments include short constructed responses at every assessed grade level. Students are asked to provide a short response to a question. Responses are scored using a prompt-specific, two-point rubric.

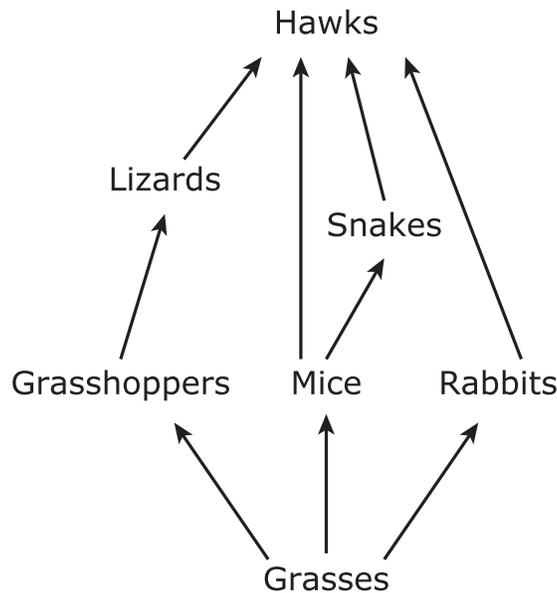
This State of Texas Assessments of Academic Readiness (STAAR®) constructed-response scoring guide provides student exemplars at all score points for a short constructed-response question from the STAAR Biology operational test. The questions are presented as they appeared on the test, and responses were scored based on the two-point rubrics that were developed with the input of Texas educators. A response earns a specific score point based on the completeness of the response provided as measured against the rubric.

The responses in this guide are actual student responses submitted online during the testing window. To protect the privacy of individual students, all names and other references of a personal nature have been altered or removed. Otherwise, the responses appear as the students wrote them and have not been modified.

Biology Short Constructed Response

Prompt

A food web is shown.



Identify and explain **ONE** effect that the removal of mice would have on the food web.

Review the food web carefully. Then enter your answer and your explanation in the box provided.

Item-Specific Rubric

Score: 2

The student response describes and explains **one** of the following:

- increase in grasses (because mice consume grasses)
- decrease in snakes (because snakes consume mice)
- decrease in rabbits (because hawks would prey upon more rabbits in the absence of mice as a food source)
- decrease in lizards (because hawks would prey upon more lizards in the absence of mice as a food source)
- decrease in hawks (because hawks consume mice as a food source)
- increase in grasshoppers (because grasshoppers compete with mice for the grasses as a food source)

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Score: 1

The student answers half of the question correctly.

Score: 0

The response is incorrect or irrelevant.

Sample Student Responses

Score Point 0

Response 1

nothing for certain things to eat

This response receives no credit. The response is incorrect or irrelevant.

The response attempts to explain an effect (“nothing for certain things to eat”), but it is vague and provides no details for how the removal of mice from the food web would affect the interactions of other animals in the food web.

Response 2

One effect is the mice gets eaten by the snake. Because it is shown in the food web.

This response receives no credit. The response is incorrect or irrelevant.

The response only repeats information given in the food web (“mice gets eaten by the snake”). This is a true statement, but it does not answer the question about how the removal of mice affects the food web and shows no understanding of how to identify and explain the effect on the food web interactions.

Response 3

Will cause other animals to die off or move to a nother spot for food

This response receives no credit. The response is incorrect or irrelevant.

The response does not attempt to identify or explain how the removal of mice would affect the given food web nor identify which animal might die off (“animals to die off or move to a nother spot for food”). While it is true that animals may move to other areas to find food, that is not relevant since the question is only asking about the food web given in the prompt.

Response 4

it can effect everything

This response receives no credit. The response is incorrect or irrelevant.

The response is too vague to determine understanding (“it can effect everything”) and does not answer the question of how the removal of mice affects the given food web. The statement is too broad and must be refined and provide specific details to receive credit. This response shows no understanding.

Score Point 1

Response 1

The removal of the mice would have on the food web is snakes would not have something to eat.

This response receives partial credit; only half of the elements are answered correctly.

The response explains the effect that the removal of mice would have on the food web ("snakes would not have something to eat") but does not identify that the snake population would decrease. Lack of identification of the effect the loss of mice as food has on the snakes shows only partial understanding.

Response 2

if you remove the mice then the snakes would eventually die out

This response receives partial credit; only half of the elements are answered correctly.

The response identifies the effect that the removal of mice would have on the food web ("snakes would eventually die out") but does not explain this effect. No attempt is made to explain that snakes die out because they lost their only food/energy source, which shows only partial understanding.

Response 3

The removal of mice will effect the snakes because that is their main food source.

This response receives partial credit; only half of the elements are answered correctly.

The response explains the effect that the removal of mice would have on the food web ("will effect the snakes because that is their main food source") but does not identify that the snake population subsequently would decrease due to a lack of food. Lack of identification that snakes decrease because they do not have mice to eat shows only partial understanding.

Response 4

The snake population would decrease.

This response receives partial credit; only half of the elements are answered correctly.

The response identifies the effect that the removal of mice would have on the food web ("snake population would decrease") but does not explain this effect. No attempt is made to explain that snakes die out because they lost their only food/energy source, which shows only partial understanding.

Score Point 2

Response 1

If the mice were to be removed from the cycle, the snake population will decrease and eventually become extinct. The reason why is because the snake depends on the mice for food and energy.

This response receives full credit. It includes each of the two required elements.

The response identifies an effect that the removal of mice would have on the food web ("If the mice were to be removed . . . the snake population will decrease") and then explains why the snakes would decrease ("the snake depends on the mice for food and energy").

Response 2

The snakes would die off for not having mice to eat. Also hawks would have two less animals to eat.

This response receives full credit. It includes each of the two required elements.

The response identifies an effect that the removal of mice would have on the food web ("snakes would die off") and then explains why the snakes would die off ("for not having mice to eat").

Additionally, this response identifies another effect that removal of mice would have on the food web ("snakes would die off . . . hawks would have two less animals to eat"). The food web indicates the hawks eat both mice and snakes, so they would lose two sources of food/energy. Either effect given by this student, either separate or together, with the explanation would be sufficient for full credit.

Response 3

The snakes would decrease over time because there wouldn't be any more mice to eat.

This response receives full credit. It includes each of the two required elements.

The response identifies an effect that the removal of mice would have on the food web ("The snakes would decrease over time") and then explains why the snakes would decrease ("because there wouldn't be any more mice to eat"). Mice are the only source of food/energy for the snakes.

Response 4

The Snake population would decrease because they eat the mice and with no mice the snake would be gone.

This response receives full credit. It includes each of the two required elements.

The student identifies an effect that the removal of mice would have on the food web ("The Snake population would decrease") and then explains why the snakes would decrease ("because they eat the mice and with no mice the snake would be gone").

Biology Short Constructed Response

Prompt

Two mutations of a genetic sequence are shown. A DNA codon chart is also shown.

Original Sequence:

3'-TAC CCG **ATA** GGC CAC-5'

Mutation 1:

3'-TAC CCG **AAA** GGC CAC-5'

Mutation 2:

3'-TAC CCG **AA** GGC CAC-5'

		Second Base				
		U	C	A	G	
First Base	U	Phenylalanine	Serine	Tyrosine	Cysteine	U
		Phenylalanine	Serine	Tyrosine	Cysteine	C
		Leucine	Serine	Stop	Stop	A
		Leucine	Serine	Stop	Tryptophan	G
	C	Leucine	Proline	Histidine	Arginine	U
		Leucine	Proline	Histidine	Arginine	C
		Leucine	Proline	Glutamine	Arginine	A
		Leucine	Proline	Glutamine	Arginine	G
	A	Isoleucine	Threonine	Asparagine	Serine	U
		Isoleucine	Threonine	Asparagine	Serine	C
		Isoleucine	Threonine	Lysine	Arginine	A
		Methionine	Threonine	Lysine	Arginine	G
	G	Valine	Alanine	Asparatic acid	Glycine	U
		Valine	Alanine	Asparatic acid	Glycine	C
		Valine	Alanine	Glutamic acid	Glycine	A
		Valine	Alanine	Glutamic acid	Glycine	G

- Which mutation would have the **MOST** significant impact on the gene product?
- Why would the impact be so significant?

Review the diagram carefully. Then enter your answer and your explanation in the box provided.

Item-Specific Rubric

Score: 2

The student identifies that **Mutation 2** will have the most significant impact because it would cause a **frameshift**.

Score: 1

The student answers half of the question correctly.

Score: 0

The response is incorrect or irrelevant.

Sample Student Responses

Score Point 0

Response 1

Mutation one will be the most significant and effective impact on the gene product, because mutation one had 3 letters that make up a gene that lead to lysine on the codon chart.

This response receives no credit. It includes none of the two required elements.

- An incorrect mutation is provided (“Mutation one will be the most significant”). Mutation 1 is a substitution mutation and not as significant as mutation 2, which is a deletion mutation.
- An incorrect explanation is provided for the significance (“because mutation one had 3 letters that make up a gene that lead to lysine”). No understanding is provided by this explanation.

Response 2

AAA

This response receives no credit. It includes none of the two required elements.

- No mutation is identified (“AAA”). This may be attempting to identify mutation 1, which would be incorrect.
- No explanation is attempted.

Response 3

mutation 1

This response receives no credit. It includes none of the two required elements.

- An incorrect mutation is identified (“mutation 1”).
- No explanation is attempted.

Response 4

mutation 3 would impact the gene product the most since it is not completed

This response receives no credit. It includes none of the two required elements.

- An incorrect mutation is provided (“mutation 3”). This is incorrect as there is no mutation 3—there are three DNA sequences given, but more detail must be given so that it is clear that the student knows which mutation is correct. Mutation 3 does not receive credit.
- An attempt is made to provide an explanation for why the impact is so significant (“impact the gene product the most since it is not completed”). However, no explanation is given for what is not completed or what impact or future implications may happen due to the incomplete codon.

Score Point 1

Response 1

mutation 2

This response receives partial credit. It includes one of the two required elements.

- The mutation that would have the most significant impact is provided (“mutation 2”).
- No attempt is made to provide an explanation why the impact of mutation 2 would be so significant.

Response 2

Mutation 2 because it removes a whole base.

This response receives partial credit. It includes one of the two required elements.

- The mutation that would have the most significant impact is provided (“Mutation 2”).
- An insufficient attempt to provide an explanation for why the impact from mutation 2 is so significant is provided (“because it removes a whole base”). The explanation defines a deletion mutation but stops short of explaining how that deletion could affect the future of the entire codon sequence; therefore, no credit can be given for element 2 since the significance of a frameshift deletion is not sufficiently described.

Response 3

A frameshift mutation would have a very significant impact on this DNA sequence as a whole, possible the greatest amount of damage that a mutation can cause to a DNA sequence. A frameshift mutation will alter most, if not all, of the DNA, due to an entirely different section of DNA being utilized.

This response receives partial credit. It includes one of the two required elements.

- No attempt is made to provide which mutation would have the most significant impact.
- The student clearly explains why the impact from mutation 2 would be so significant (“A frameshift mutation would have a very significant impact . . . will alter most, if not all, of the DNA, due to an entirely different section of DNA being utilized”).

Response 4

The last mutation (AA) would have the most impact on the gene product because it is incomplete. If the genetic sequence is incomplete, the gene product will be invalid, which may lead to severe complications.

This response receives partial credit. It includes one of the two required elements.

- The mutation that would have the most significant impact is provided (“The last mutation [AA] would have the most impact . . .”). While this does not specifically name mutation 2, it does describe the mutation in enough detail for us to know which one is being referenced.
- An attempt is made to provide an explanation for why the impact from mutation 2 is so significant (“because it is incomplete . . . the genetic sequence is incomplete, the gene product will be invalid, which may lead to severe complications”), but it is too vague to determine if the student really knows what is happening in a frameshift mutation. The student’s only reference to the impact that all translation past the codon is affected is that it might lead to “severe complications.” Therefore, no credit can be given for element two.

Score Point 2

Response 1

Mutation 2 would have the biggest effect on the sequence because it will cause a frameshift mutation.

This response receives full credit. It includes valid answers to each of the two elements.

- The mutation that would have the most significant impact is provided ("Mutation 2 would have the biggest effect . . ."). The student correctly identifies mutation 2.
- The student clearly explains why the impact from mutation 2 would be so significant ("it will cause [cause] a frameshift").

Response 2

-Mutation 2 would have the most significant impact on the product.
-The frameshift mutation (#2) is changing every codon after the mutation, while the substitution (#1) only changes the codon containing it.

This response receives full credit. It includes valid answers to each of the two elements.

- The mutation that would have the most significant impact is provided ("Mutation 2"). The student correctly identifies mutation 2.
- The student clearly explains why the impact from mutation 2 would be so significant ("The frameshift mutation [#2] is changing every codon after the mutation"). The student provides the word *frameshift*, which on its own would be sufficient, but then goes on to explain that the deletion shifts and changes every codon after the mutation. The student supports that this mutation is the most significant by contrasting it with a substitution mutation that changes only the one codon that contains the substitution mutation ("while the substitution [#1] only changes the codon containing it").

Response 3

Mutation #2 would have the greatest impact on the gene product because since one base is removed, it will cause all of the other bases to move up one forward and it will create completely different amino acids, causing it to create completely different proteins.

This response receives full credit. It includes valid answers to each of the two elements.

- The mutation that would have the most significant impact is provided ("Mutation #2 . . . since one base is removed"). The student correctly identifies mutation 2.
- The student clearly explains why the impact from mutation 2 would be so significant ("it will cause all of the other bases to move up one forward and it will create completely different amino acids, causing it to create completely different proteins"). This response receives credit for element two without using the label *frameshift mutation* because they describe what happens when there is a frameshift, focusing on the future change of the codon and every codon after from this point.

Response 4

Mutation 2 would have a more profound impact on the DNA, as a deletion shifts the entire sequence, versus a substitution, which only changes one codon

This response receives full credit. It includes valid answers to each of the two elements.

- The mutation that would have the most significant impact is provided. ("Mutation 2 would have a more profound impact"). The student correctly identifies mutation 2.
- The student clearly explains why the impact from mutation 2 would be so significant ("as a deletion shifts the entire sequence, versus a substitution, which only changes one codon"). This response receives credit for element two without using the label *frameshift mutation* because they describe what happens when there is a "deletion," focusing on the future change of the entire sequence and contrasting that to a "substitution," which only changes one codon in the sequence.