



Biology

Short Constructed-Response Scoring Guide

Spring 2024

General Information

Beginning with the 2022–2023 school year, science assessments include short constructed-response questions 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

In animal cells, the sodium-potassium pump moves sodium and potassium ions against a concentration gradient across the cell membrane.

What type of transport is used, **AND** why is this type of transport necessary?

Read the question carefully. Then enter your answers in the box provided.

Item-Specific Rubric

Score: 2

The response provides complete and correct understanding:

- Identifies the type of transport used across the cell membrane.
 - Active transport

AND

- Explains why this type of transport is necessary.

Score: 1

The student answers half of the question correctly. The response provides partial understanding.

Score: 0

The response is incorrect or irrelevant. The response provides little to no understanding.

Sample Student Responses

Score Point 0

Response 1

Osmosis is used because it is active transport and active transport is used to move molecules against the gradient.

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

An incorrect attempt is made to identify the type of transport used across the cell membrane ("Osmosis is used because it is active transport"). Although the words "active transport" are used, the response incorrectly states that "Osmosis is used because it is active transport." This contradiction keeps this element from demonstrating an understanding of the type of transport used. Note that osmosis is a type of passive transport, and the use of two different types of transport in the response shows misunderstanding of how to correctly identify the type of transport used.

An insufficient explanation is provided to explain why this type of transport is necessary ("used to move molecules against the gradient"). The energy/ATP needed for this movement is not provided. Note that the incorrect answer to the first element means that no credit can be received for this element, even if it is sufficient.

Response 2

the cell use the ATP for transporting sustances acroos concentration gradent the ATP is necessary because is energi that help the sutances in trhe cell

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

No attempt is made to provide the type of transport used across the cell membrane.

An insufficient explanation is provided to explain why this type of transport is necessary ("the cell use the ATP for transporting sustances acroos concentration gradent"). While an explanation of the movement of substances across a concentration gradient using ATP is provided, it is not attributed to a type of transport. Without a correct form of transport identified in the first element, no credit can be given for this element.

Response 3

Passive because it is moving the sodium and potassium against the concentration gradient. This is important because if not it would pump to not necessary places in the body.

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

An incorrect attempt is made to provide the type of transport used across the cell membrane ("Passive"). No type of transport is named, and any type of "passive" transport would be incorrect.

An incorrect explanation is provided to explain why this type of transport is necessary ("Passive because it is moving the sodium and potassium against the concentration gradient"). Passive transport would not be able to move ions against a concentration gradient. Without a correct form of transport identified in the first element, no credit can be given for this element, even if it is correct.

Response 4

Cellular Transportation so the flow nutrients in the cell a can flow.

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

An incorrect type of transport used across the cell membrane is provided ("Cellular Transportation"). Although active transport is a type of cellular transport, "cellular transportation" is not specific enough.

An incorrect explanation is provided to explain why this type of transport is necessary ("so the flow nutrients in the cell a can flow").

Score Point 1

Response 1

The type of transport used is active because it is going high-low. Active transport needs energy and if it was passive it wouldn't use the word pump because you need energy to pump something. The reason active is necessary is because animal cells need energy to move or pump something. Active is also necessary because it is in most of your cells.

The response addresses half of the question correctly and demonstrates partial understanding. It includes one of the two required elements.

- Identifies the type of transport used across the cell membrane ("Active transport").

An insufficient explanation is provided to explain why this type of transport is necessary ("because it is going high-low. Active transport needs energy"). While the explanation correctly provides that active transport requires energy, it is incorrectly explained that this is because "it is going high-low," which describes going WITH the concentration gradient, which is incorrect. The ions require energy to move from an area of low concentration to an area of high concentration.

Response 2

active transport because it requires energy for it to flow.

The response addresses half of the question correctly and demonstrates partial understanding. It includes one of the two required elements.

- Identifies the type of transport used across the cell membrane ("active transport").

An insufficient explanation is provided to explain why this type of transport is necessary ("because it requires energy for it to flow"). Indicating that energy, or ATP, is necessary is not sufficient for credit for this element. In order to be complete, an explanation must be provided for why active transport, which uses ATP energy, is necessary. In this response a very minimal explanation is attempted, but "for it to flow" does not indicate direction; there is no indication that the ions are moving against a concentration gradient.

Response 3

Active transport is used and it is necessary to move the sodium and potassium ions to a low concentration to high concentration.

The response addresses half of the question correctly and demonstrates partial understanding. It includes one of the two required elements.

- Identifies the type of transport used across the cell membrane (“Active transport”).

An insufficient explanation is provided to explain why this type of transport is necessary (“necessary to move the sodium and potassium ions to a low concentration to high concentration”). While an explanation of the movement of the ions across a concentration gradient is provided, it is somewhat unclear, and no attempt is made to explain that energy is needed during active transport.

Response 4

The type of transportation that is used is active transportation and this type of transportation is necessary because without it things would always have to move with the concentration gradient.

The response addresses half of the question correctly and demonstrates partial understanding. It includes one of the two required elements.

- Identifies the type of transport used across the cell membrane (“active transportation”).

An insufficient explanation is provided to explain why this type of transport is necessary. Although it is true that active transport is needed “because without it things would always have to move with the concentration gradient,” no attempt is made to explain that ATP/energy is required to facilitate the movement of the ions.

Score Point 2

Response 1

In this case active transport is used to move the sodium and potassium ions against the concentration gradient. Active transport requires ATP, and molecules can move from low concentrated areas to high concentrated areas. This type of transport is necessary in this situation because the the concentration inside the cell membrane is higher that the concentration outside of the cell membrane.

The response demonstrates complete and correct understanding. It includes each of the two required elements.

- Identifies the type of transport used across the cell membrane (“active transport”).
- Explains why this type of transport is necessary (“active transport is used to move the sodium and potassium ions against the concentration gradient. Active transport requires ATP, and molecules can move from low concentrated areas to high concentrated areas”). The response explains that energy in the form of ATP is used and supports why active transport is necessary by describing the movement of ions across the concentration gradient from an area of low concentration to an area of high concentration.

Response 2

Active transportation is being used and this type of transport is necessary because it requires the use of energy to go up the concentration gradient.

The response demonstrates complete and correct understanding. It includes each of the two required elements.

- Identifies the type of transport used across the cell membrane (“Active transportation”).
- Explains why this type of transport is necessary (“because it requires the use of energy to go up the concentration gradient”). The phrase “go up the concentration gradient” can be read as “against a concentration gradient” and is sufficient explanation of the need for energy to move the sodium and potassium ions against their concentration gradient.

Response 3

This is an exaple of active transport because it is being moved AGAINST the gradient, you would ned ATP for this.

The response demonstrates complete and correct understanding. It includes each of the two required elements.

- Identifies the type of transport used across the cell membrane (“active transport”).
- Explains why this type of transport is necessary (“because it is being moved AGAINST the gradient, you would ned ATP for this”). The student explains that the movement of the ions against a concentration gradient requires ATP. Note that either the word “energy” or “ATP” is acceptable.

Response 4

The type of transport used is active transport. Active transport is necessary because some molecules are harder to get across the cell membrane meaning it would require ATP energy which is active transport.

The response demonstrates complete and correct understanding. It includes each of the two required elements.

- Identifies the type of transport used across the cell membrane (“active transport”).
- Explains why this type of transport is necessary (“Active transport is necessary because some molecules are harder to get across the cell membrane meaning it would require ATP energy”). Stating that “some molecules are harder to get across the cell membrane” is sufficient explanation of why active transport and energy is necessary.

Biology Short Constructed Response

Prompt

Ecological relationships occur between two species that live close to each other. Two examples of ecological relationships are described.

- **Example 1:** Bees gather nectar and pollen from flowering plants, providing food for the bees. As the bees move to different flowers, some of the pollen attached to the bees' bodies is spread and released. If the pollen falls on the flower of a plant of the same species, it may fertilize the plant and produce seeds.
- **Example 2:** Orchids are flowering plants that grow on other plants. They typically grow in tall trees high in the canopy, where they can reach sunlight for photosynthesis. They get water and nutrients from rainwater runoff that carries organic material down the host plant's branches. No water or nutrients are taken from the host plant.

What is the main difference between the ecological relationships described in the two examples? Include the scientific term used to define each of the relationships.

Think about the question carefully. Then enter your answer in the box provided.

Item-Specific Rubric

Score: 2

The response provides complete and correct understanding:

- Explains the main difference between the ecological relationships described in the two examples.

AND

- Includes the scientific term used to define each of the two relationships:
 - Example 1: bees and flowering plants—mutualism
 - Example 2: orchards and tall trees—commensalism

Score: 1

The student answers half of the question correctly. The response provides partial understanding:

The student correctly identifies and explains one of the two relationships.

Note: Using the same scientific term for both examples is not a correct identification of a relationship nor correct usage of the scientific term.

OR

The student identifies Example 1 as mutualism and Example 2 as commensalism with incomplete or missing explanations.

OR

The student only compares both examples for the main difference between the ecological relationships (benefits).

Score: 0

The response is incorrect or irrelevant. The response provides little to no understanding.

Sample Student Responses

Score Point 0

Response 1

The first example is commensalism because both gain from the relationship while in the second example the orchids are the only ones that gain but due to them not hurting the tree that they are attached to it would be mutualism

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

The response incorrectly identifies Example 1 as commensalism and provides an incorrect explanation of the ecological relationship for commensalism ("first example is commensalism because both gain from the relationship"). Providing the incorrect ecological relationship for the scientific term used to identify the relationship demonstrates no understanding.

The response incorrectly identifies Example 2 as mutualism and provides an incorrect explanation of the ecological relationship for mutualism ("in the second example the orchids are the only ones that gain but due to them not hurting the tree that they are attached to it would be mutualism"). Providing the incorrect ecological relationship for the scientific term used to identify the relationship demonstrates no understanding.

Response 2

in the first example the bees are taking pollen from the flowering plants therefore taking nutrients from it unlike the bee in example 1 the orchid is not taking any nutrients from the tree that is the main difference

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

The response does not identify Example 1 as mutualism, nor does it provide a correct explanation of the ecological relationship for mutualism ("in the first example the bees are taking pollen from the flowering plants therefore taking nutrients from it"). No attempt is made to explain that in this relationship, both organisms, bees and flowering plants, benefit.

The response does not identify Example 2 as commensalism, nor does it provide a correct explanation of the ecological relationship for commensalism ("unlike the bee in example 1 the orchid is not taking any nutrients from the tree that is the main difference"). While it is true that bees obtain nutrients from the flowers, and the orchid does not obtain nutrients from its host, the focus in this response is on the difference in obtaining nutrients instead of the main difference being who benefits or does not benefit in the relationships.

Response 3

The main difference between the ecological relationships are that the first example produces food for its self and others, while the seconded example only makes food for its self .

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

No attempt is made to provide scientific terms to define the ecological relationships.

No valid explanation of the main difference in the ecological relationships is provided ("main difference . . . the first example produces food for its self and others, while the seconded example only makes food for its self").

Response 4

The main differenca between the ecological relationships described in the two examples above is the bees gather nectar and pollen from flowering plants but as the bees move to different flowers,some of the pollen attached the the bees bodies is spread and relased on to the folwer thats its on and if it the same specise of plant that plant might just fertilize it.The orchids are flowering plants that grow on other plants typically in tall trees to reach sunlight and get nutrients from the rainwater runoff.

The response is incorrect or irrelevant and demonstrates little to no understanding. It includes neither of the required elements.

No attempt is made to provide scientific terms to define the ecological relationships.

No valid explanation of the main difference in the ecological relationships is provided as the student summarizes information provided in the prompt. No attempt is made to analyze the information given and provide an explanation of a difference between the two types of relationships.

Score Point 1

Response 1

example 1 is mutualism because both the bees and the flowers get benefit from it, bees get their food from flowers and the bees help flowers produce seeds to reproduce (if the pollen falls on the flower of a plant of the same species).

example 2 i dont remember the name (i think it is neutralism) but just one organism get benefits from it and the other one is neutral about it. Orchids get their sunlight and water mean while the host still gets their water and sunlight at the same time without being affected at all.

The response addresses half of the question correctly and demonstrates partial understanding. The student correctly identifies and explains one of the two relationships.

- Correctly identifies Example 1 as mutualism and provides an explanation of the ecological relationship to contrast the difference with Example 2 (“example 1 is mutualism because both the bees and the flowers get benefit from it”).

An incorrect scientific term is used for the second relationship (“example 2 . . . [i think it is neutralism]”). While the response explains the ecological relationship (“but just one organism get benefits from it and the other one is neutral about it . . . without [the host] being affected at all”), no credit is received, since it used an incorrect scientific term to identify this relationship.

Response 2

The main difference between the ecological relationships are example 1 is the process of pollinations which aids in reproduction in plants, example 2 is when one organism uses another organism to survive, which is called commensalism. The host (tall tree) is not effected while the orchids benefit from the tree.

The response addresses half of the question correctly and demonstrates partial understanding. The student correctly identifies and explains one of the two relationships.

- Correctly identifies Example 2 as commensalism and provides an explanation to contrast the difference with Example 1 (“example 2 is when one organism uses another organism to survive, which is called commensalism. The host [tall tree] is not effected while the orchids benefit from the tree”). While “uses another” is vague, meaning is clarified to show understanding of the full definition of commensalism by explaining that one organism benefits while the host is unaffected.

No scientific term is provided for Example 1, and the explanation of the ecological relationship is vague and insufficient (“example 1 is the process of pollinations which aids in reproduction in plants”).

Response 3

in example 1 the flowers are more likley to be in a open field compared to example 2 where theyre in a canopy high in the trees. Example one has a mutalistic relationship and example 2 is a commensalism relation.

The response addresses half of the question correctly and demonstrates partial understanding. The student identifies Example 1 as mutualism and Example 2 as commensalism, but with incomplete or missing explanations.

- Correctly identifies Example 1 as mutualism and Example 2 as commensalism (“Example one has a mutalistic relationship and example 2 is a commensalism relation”). Credit is given for providing the correct scientific term to define each of the two relationships.

No valid explanation of the ecological relationships is provided (“example 1 the flowers are more likley to be in a open field compared to example 2 where theyre in a canopy high in the trees”). The explanations given for both relationships are incomplete and irrelevant.

Response 4

The main difference between this two examples is that in example 1 both the bees and the plants get to benefit in one way or another, and in example 2 only one “benefits” while the other is unharmed.

The response addresses half of the question correctly and demonstrates partial understanding. The student only discusses the main difference between the ecological relationships (benefits).

- Correctly explains the main difference between the ecological relationships described in the two examples (“main difference between this two examples is that in example 1 both the bees and the plants get to benefit . . . in example 2 only one ‘benefits’ while the other is unharmed”). This minimal explanation of the main difference between the two relationships is sufficient to receive credit (see rubric score point 1).

No scientific terms to define the ecological relationships are provided.

Score Point 2

Response 1

The main difference between the ecological relationships described in the two examples is that the relationship in example 1 is mutualism while the relationship in example 2 is commensalism. In example 1 the relationship is mutualism because both species benefit from the interaction, the bees obtain food while the plants receive assistance pollinating. Meanwhile, example 2 is commensalism because one organism benefits while the other is unaffected. In this case the Orchid gets water and nutrients from rainwater runoff while the host plant is unaffected.

The response demonstrates complete and correct understanding. It includes each of the two required elements: correctly explains the main difference between the ecological relationships described in the two examples **AND** correctly includes the scientific term used to define each relationship.

- Correctly identifies Example 1 as mutualism and provides an explanation of the ecological relationship to contrast with Example 2 (“example 1 . . . mutualism because both species benefit from the interaction, the bees obtain food while the plants receive assistance pollinating”).
- Correctly identifies Example 2 as commensalism and provides an explanation of the ecological relationship to contrast the difference with Example 1 (“example 2 is commensalism because one organism benefits while the other is unaffected. In this case the Orchid gets water and nutrients from rainwater runoff”).

Response 2

In example 1, the bees and flowers are participating in a mutualistic relationship which brings benefits to both bees and flowers. However in example 2, the Orchids are using the trees without harm, but also without any benefit to the tree. This is an example of commensalism.

The response demonstrates complete and correct understanding. It includes each of the two required elements: correctly explains the main difference between the ecological relationships described in the two examples **AND** correctly includes the scientific term used to define each relationship.

- Correctly identifies Example 1 as a mutualistic relationship and provides an explanation of the ecological relationship to contrast the difference with Example 2 (“example 1, the bees and flowers are participating in a mutualistic relationship which brings benefits to both bees and flowers”). The phrase “mutualistic relationship” is an acceptable alternative to the scientific term of “mutualism.”
- Correctly identifies Example 2 as commensalism and provides an explanation of the ecological relationship to contrast the difference with Example 1 (“example 2, the Orchids are using the trees without harm, but also without any benefit to the tree. This is an example of commensalism”).

Response 3

The first relationship is mutualism which means that both organisms benefit from their relationship, and the second relationship is commensalism which means that one organism benefits from the relationship and the other is not harmed.

The response demonstrates complete and correct understanding. It includes each of the two required elements: correctly explains the main difference between the ecological relationships described in the two examples **AND** correctly includes the scientific term used to define each relationship.

- Correctly identifies Example 1 as mutualism and provides an explanation of the ecological relationship to contrast the difference with Example 2 (“first relationship is mutualism which means that both organisms benefit from their relationship”).
- Correctly identifies Example 2 as commensalism and provides an explanation of the ecological relationship to contrast the difference with Example 1 (“second relationship is commensalism which means that one organism benefits from the relationship and the other is not harmed”). When describing commensalism, note that a full definition provides that one organism benefits, but that the host neither benefits nor is harmed; the host is unaffected.

Response 4

In example one they both benefit (mutualism) where in example 2 only one benefits (commensalism)

The response demonstrates complete and correct understanding. It includes each of the two required elements: correctly explains the main difference between the ecological relationships described in the two examples **AND** correctly includes the scientific term used to define each relationship.

- Correctly identifies Example 1 as mutualism and provides an explanation of the ecological relationship to contrast the difference with Example 2 (“In example one they both benefit [mutualism]”). A minimal but sufficient explanation is provided to explain that both organisms benefit in this relationship.
- Correctly identifies Example 2 as commensalism and provides an explanation of the ecological relationship to contrast the difference with Example 1 (“in example 2 only one benefits [commensalism]”). Note that the explanation provided for this relationship “only one benefits” is incomplete; no mention that the host neither benefits nor is harmed is provided. However, in this response it helps that the relationship is correctly identified as commensalism and that the student is minimally providing a main difference between the two relationships—in mutualism two organisms benefit, and in commensalism only one organism benefits.