

# 2023 MCAS Sample Student Work and Scoring Guide

## High School Biology

### Question 20: Constructed-Response

**Reporting Category:** Molecules to Organisms

**Practice Category:** None

**Standard:** [HS.LS.1.4](#) - Construct an explanation using evidence for why the cell cycle is necessary for the growth, maintenance, and repair of multicellular organisms. Model the major events of the cell cycle, including (a) cell growth and DNA replication, (b) separation of chromosomes (mitosis), and (c) separation of cell contents.

**Item Description:** Describe events of interphase, explain why mitosis must occur before cytokinesis, and explain the effect on the human body if a person's cells stopped going through mitosis and cytokinesis.

[View item in MCAS Digital Item Library](#)

### Scoring Guide

Select a score point in the table below to view the sample student response.

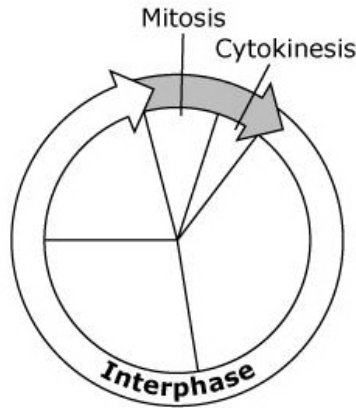
Score*	Description
<a href="#">4A</a>	The response demonstrates a thorough understanding of the cell cycle. The response clearly describes two processes that happen to cells during the interphase stage of the cell cycle. The response also clearly explains why mitosis must occur before cytokinesis and clearly describes one way a person's body would be affected if cells did not go through mitosis and cytokinesis.
<a href="#">4B</a>	
<a href="#">3</a>	The response demonstrates a general understanding of the cell cycle.
<a href="#">2</a>	The response demonstrates a limited understanding of the cell cycle.
<a href="#">1</a>	The response demonstrates a minimal understanding of the cell cycle.
<a href="#">0</a>	The response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.

\*Letters are used to distinguish between sample student responses that earned the same score (e.g., 4A and 4B).

**Score Point 4A**

This question has three parts.

An adult human body contains trillions of cells. Body cells go through the stages of the cell cycle. A diagram of the cell cycle is shown.

**Part A**

Describe **two** events that occur during the interphase stage of the cell cycle.

During interphase, the cell grows and prepares to start dividing, and the DNA in the cell gets replicated into an identical copy that will go to the new cell.

**Part B**

Mitosis and cytokinesis are important stages of the cell cycle.

Explain why mitosis must occur before cytokinesis.

Mitosis must occur before cytokinesis because mitosis is when the nucleus divides and the chromosomes are separated to both sides of the cell. If this did not happen before cytokinesis, then the cytoplasm would divide and the new cell would not have the right DNA and chromosomes to function.

**Part C**

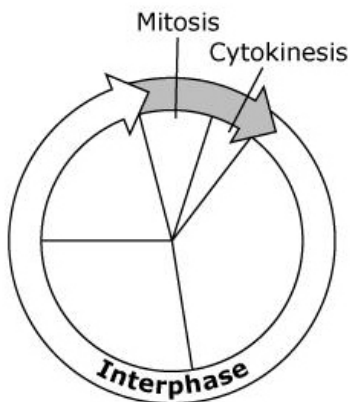
Describe one way a person's body would be affected if cells stopped going through mitosis and cytokinesis.

A person's body would be affected if cells stopped going through mitosis and cytokinesis because the damaged or dead cells would not be able to be replaced. If cells like skin cells were damaged and did not get replaced by new cells, then the person would have damage in their skin, and be open to infections and other diseases that could penetrate the open spaces.

**Score Point 4B**

This question has three parts.

An adult human body contains trillions of cells. Body cells go through the stages of the cell cycle. A diagram of the cell cycle is shown.

**Part A**

Describe **two** events that occur during the interphase stage of the cell cycle.

The cell grows and DNA is copied so it can be distributed to the next cell.

**Part B**

Mitosis and cytokinesis are important stages of the cell cycle.

Explain why mitosis must occur before cytokinesis.

The chromosomes must split and be separated from each other before, if not, cytokinesis will place random chromosomes in random places. This would not make identical cells, one would have some chromosomes and the other would have different ones.

**Part C**

Describe one way a person's body would be affected if cells stopped going through mitosis and cytokinesis.

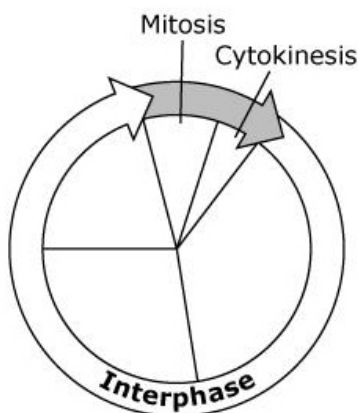
They wouldn't be able to regenerate lost cells in the body, they would simply never heal or grow.

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**Score Point 3**

This question has three parts.

An adult human body contains trillions of cells. Body cells go through the stages of the cell cycle. A diagram of the cell cycle is shown.

**Part A**

Describe **two** events that occur during the interphase stage of the cell cycle.

During the interphase stage, cells grow and mature until they go into mitosis.

**Part B**

Mitosis and cytokinesis are important stages of the cell cycle.

Explain why mitosis must occur before cytokinesis.

Mitosis must occur before cytokinesis because cytokinesis is when the cell splits to form two cells and before that happens, DNA needs to be organized so both cells get the right amount.

**Part C**

Describe one way a person's body would be affected if cells stopped going through mitosis and cytokinesis.

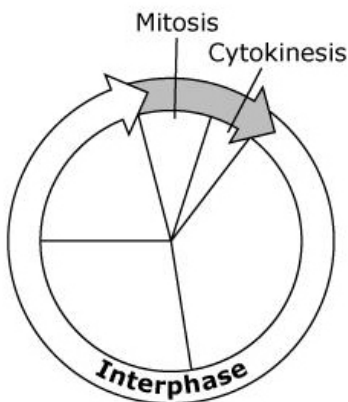
If cells stopped going through mitosis and cytokinesis, then a person's body would not be able to grow or heal.

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**Score Point 2**

This question has three parts.

An adult human body contains trillions of cells. Body cells go through the stages of the cell cycle. A diagram of the cell cycle is shown.

**Part A**

Describe **two** events that occur during the interphase stage of the cell cycle.

The cell grows, allowing it to prepare for mitosis. The cell also develops, allowing it to change with time before mitosis.

**Part B**

Mitosis and cytokinesis are important stages of the cell cycle.

Explain why mitosis must occur before cytokinesis.

Mitosis must occur before cytokinesis because the new cells produced from mitosis must go through cytokinesis before interphase.

**Part C**

Describe one way a person's body would be affected if cells stopped going through mitosis and cytokinesis.

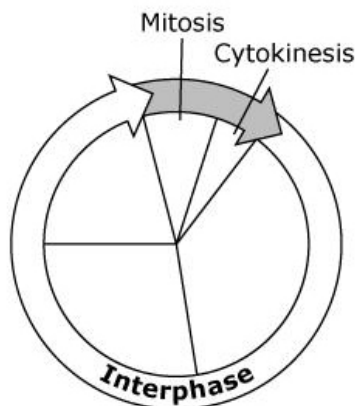
The person would stop growing and eventually die because the cells wouldn't be reproducing and all of their cells would eventually die without being replaced.

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**Score Point 1**

This question has three parts.

An adult human body contains trillions of cells. Body cells go through the stages of the cell cycle. A diagram of the cell cycle is shown.

**Part A**

Describe **two** events that occur during the interphase stage of the cell cycle.

Two event sthat happen when the go into the interphase is Mitosis and cytokinesis. It happens after and before the interphase and redoes its self while it keeps going into a cycle

**Part B**

Mitosis and cytokinesis are important stages of the cell cycle.

Explain why mitosis must occur before cytokinesis.

Mitosis occurs before cytokinesis because it is getting ready for that stage to come and has a important role to play before going into the cytokinesis

**Part C**

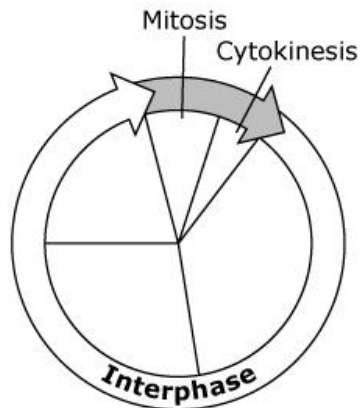
Describe one way a person's body would be affected if cells stopped going through mitosis and cytokinesis.

The body wouldn be able to grow anymore or get stronger because cells arent replacating itself, meaning no growing, no getting stronger, and the cells that are dying would not be able to make more of itself causing the cells to die, witch also means where slowly dying.

**Score Point 0**

This question has three parts.

An adult human body contains trillions of cells. Body cells go through the stages of the cell cycle. A diagram of the cell cycle is shown.

**Part A**

Describe **two** events that occur during the interphase stage of the cell cycle.

mitosis and cytokinesis

**Part B**

Mitosis and cytokinesis are important stages of the cell cycle.

Explain why mitosis must occur before cytokinesis.

to store energy

**Part C**

Describe one way a person's body would be affected if cells stopped going through mitosis and cytokinesis.

they would die

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