2026 MCAS Sample Student Work and Scoring Guide

High School Biology
Question 15: Constructed-Response

Reporting Category: Evolution
Practice Category: Evidence, Reasoning, and Modeling

Standard: HS.LS.4.2 Construct an explanation based on evidence that Darwin's theory of evolution by natural selection occurs in a population when the following conditions are met: (a) more offspring are produced than can be supported by the environment, (b) there is heritable variation among individuals, and (c) some of these variations lead to differential fitness among individuals as some individuals are better able to compete for limited resources than others.

Item Description: Identify how an adaptation can become part of the gene pool and explain how that adaptation can become more common in the population over time.

This item can be found in the released item sets on the MCAS Resource Center.

Scoring Guide

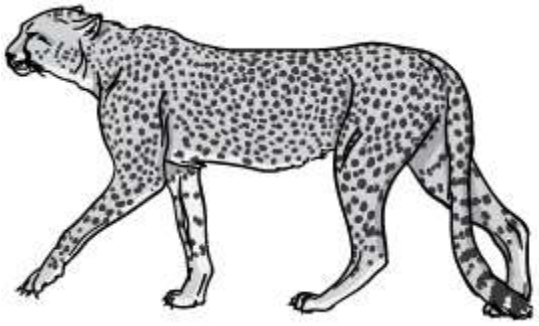
Select a score point in the table below to view the sample student response.

Score*	Description
3A **3B**	The response demonstrates a thorough understanding of Darwin's theory of evolution by natural selection. The response correctly identifies one way disease resistance could be naturally introduced into the Asian cheetah population and clearly explains how disease resistance can become more common in the cheetah population.
2	The response demonstrates a partial understanding of Darwin's theory of evolution by natural selection.
1	The response demonstrates a minimal understanding of Darwin's theory of evolution by natural selection.
0	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., 3A and 3B).

Module Introduction

Cheetahs (*Acinonyx jubatus*) are the world's fastest land animals. Cheetahs have many adaptations that allow them to accelerate and change direction quickly when chasing prey at high speeds. A picture of a cheetah is shown.



Cheetah populations are decreasing. Several factors have contributed to this decline. The cheetah's habitat has decreased due to human activities, including use of land for farming and housing developments. As a result of this decrease in habitat, encounters between cheetahs and other large predators, such as lions and hyenas, have become more common. Cheetahs are unable to fight off these large predators that often steal their food. Food sources of cheetahs include herbivores, such as antelopes and zebras.

The historic range of cheetahs included most of Africa and central Asia. Today, there are two main cheetah populations, one in Africa and the other hundreds of miles away in Asia. Both populations live in an area that is only a small fraction of their historic range.

The African cheetah population likely experienced a "bottleneck," or a severe decrease in population size, approximately 12,000 years ago. As a result, considerable inbreeding occurred as closely related individuals mated and produced offspring. The Asian population separated from the African population before the bottleneck. The size of the Asian population today is estimated to be fewer than 100 individuals.

Score Point 3A

This question has two parts.

With only about 100 wild Asian cheetahs left, individual cheetahs in this population are less likely to have traits that allow them to withstand an environmental change. For example, if a disease were introduced to the population, only a few individuals would likely be resistant to the disease.

Part A

Identify one way disease resistance could be naturally introduced into the Asian cheetah population.

> Disease resistance could be naturally introduced into the Asian cheetah population through a genetic mutation.

Part B

Using your knowledge of natural selection, explain how disease resistance could become more common in the cheetah population.

> Disease resistance could become more common because if one, or a few cheetahs have a mutation that makes them disease resistant then if there ever is a disease more of these cheetahs will survive then the ones that do not have the resistance. So the ones with the resistance will pass this gene mutation onto their offspring. So every generation more and more of the population is disease resistant. Soon after this gene mutation has been passed down for a few generations all of the cheetahs will have this mutation.

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Score Point 3B

This question has two parts.

With only about 100 wild Asian cheetahs left, individual cheetahs in this population are less likely to have traits that allow them to withstand an environmental change. For example, if a disease were introduced to the population, only a few individuals would likely be resistant to the disease.

Part A

Identify one way disease resistance could be naturally introduced into the Asian cheetah population.

Disease resistance could be naturally introduced by mutations in the DNA that help the immune system fight the disease.

Part B

Using your knowledge of natural selection, explain how disease resistance could become more common in the cheetah population.

If the cheetahs have a mutation that helps with disease resistance, then they would have a better survival rate if disease broke out. More cheetahs with the mutation would be alive than cheetahs without, so the cheetahs with the mutation would produce more offspring. The cheetahs with the mutation would pass their gene on to their offspring, so eventually more of the cheetah population will have that mutated gene than not have the mutated gene.

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Score Point 2

This question has two parts.

With only about 100 wild Asian cheetahs left, individual cheetahs in this population are less likely to have traits that allow them to withstand an environmental change. For example, if a disease were introduced to the population, only a few individuals would likely be resistant to the disease.

Part A

Identify one way disease resistance could be naturally introduced into the Asian cheetah population.

cheetahs with an immunity gene will survive and eventually reproduce more than those that don't have the gene (they'll die and can't reproduce)

Part B

Using your knowledge of natural selection, explain how disease resistance could become more common in the cheetah population.

natural selection- over time, cheetahs with an immunity to the disease would be able to survive and eventually reproduce while those who aren't immune will die off and not reproduce. the reproduction of "successful" cheetahs will increase the immunity gene in the gene pool and the cycle of reproduction of the "fit" cheetahs and deaths of the "unfit" would eventually cause the disease resistance to be fully introduced and spread in population.

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Score Point 1

This question has two parts.

With only about 100 wild Asian cheetahs left, individual cheetahs in this population are less likely to have traits that allow them to withstand an environmental change. For example, if a disease were introduced to the population, only a few individuals would likely be resistant to the disease.

Part A

Identify one way disease resistance could be naturally introduced into the Asian cheetah population.

> One way disease resistance could be naturally introduced into the Asain cheetah population is mutation.

Part B

Using your knowledge of natural selection, explain how disease resistance could become more common in the cheetah population.

> Disease resistance could become more common in the cheetah population because natural selection allows for cheetahs to adapt and acquire traits in the changed environment.

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Score Point 0

This question has two parts.

With only about 100 wild Asian cheetahs left, individual cheetahs in this population are less likely to have traits that allow them to withstand an environmental change. For example, if a disease were introduced to the population, only a few individuals would likely be resistant to the disease.

Part A

Identify one way disease resistance could be naturally introduced into the Asian cheetah population.

> If more cheetahs restistant to disease mate and make offspring also resistant to the disease it will come natural to the population.

Part B

Using your knowledge of natural selection, explain how disease resistance could become more common in the cheetah population.

> If there are offspring that can adapt to a disease eventually others will realize they need the same ability and eventually they'll be able to do the same.

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