

2025 MCAS Sample Student Work and Scoring Guide

High School Biology

Question 16: Constructed-Response

Reporting Category: Ecology

Practice Category: Evidence, Reasoning, and Modeling

Standard: [S.LS.2.7](#) - Analyze direct and indirect effects of human activities on biodiversity and ecosystem health, specifically habitat fragmentation, introduction of non-native or invasive species, overharvesting, pollution, and climate change. Evaluate and refine a solution for reducing the impacts of human activities on biodiversity and ecosystem health.

Item Description: Explain how the reintroduction of a species affected a native species, describe one way an ecosystem benefited from the removal of an invasive species, explain how removing the invasive species affected the native species, and explain how an action humans could take could help the native species.

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	The response demonstrates a thorough understanding of how human activities affect biodiversity and ecosystem health. The response clearly explains how reintroducing bald eagles helped to increase the island fox population. The response clearly describes one way the island ecosystem benefited from the removal of feral pigs and clearly explains how the removal helped to increase the island fox population. The response also clearly describes another action humans could take to increase the island fox population and clearly explains how the action would increase the size of the island fox population.
3B	
2	The response demonstrates a partial understanding of how human activities affect biodiversity and ecosystem health.
1	The response demonstrates a minimal understanding of how human activities affect biodiversity and ecosystem health.
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).

Score Point 3A

The island fox is a small fox that lives on Santa Cruz Island off the coast of California. It is a descendant of the gray fox that is found on the mainland in California. From 1994 to 2000, the island fox population on Santa Cruz Island declined from 1,465 to only 62 individuals.

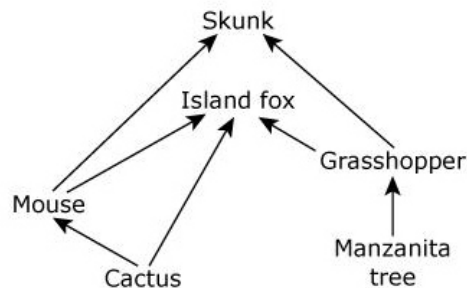
Several events on Santa Cruz Island caused the island fox population to decrease. In the 1800s, people introduced non-native plants and farm animals, including pigs, to the island. Some of the pigs escaped and reproduced in the wild, eventually producing a large population of feral (wild) pigs. The feral pigs dug up and ate native plants, including cactus plants and manzanita trees.

Young, small feral pigs on the island became a food source for visiting golden eagles. However, golden eagles were unable to nest on the island because the bald eagles living there chased them away. The bald eagles hunted fish from the ocean, but they did not eat feral pigs or island foxes. Other small mammals that lived on the island included mice and skunks. The sizes of these animal populations were not directly affected by the visiting golden eagles.

From 1950 to 1980, the bald eagle population on the island was greatly reduced as a result of the use of the chemical DDT. By 1994, there were no longer any bald eagles on the island. Golden eagles then began nesting on the island and hunting island foxes as well as the young feral pigs.

Since 2000, humans have helped restore the island fox population on Santa Cruz Island by removing feral pigs and golden eagles from the island and reintroducing bald eagles.

A food web **after** the island fox population was restored on the island is shown.



This question has three parts.

Humans helped increase the island fox population on Santa Cruz Island by removing feral pigs and golden eagles from the island and by reintroducing bald eagles.

Part A

Explain how reintroducing bald eagles helped to increase the island fox population.

Bald eagles chased away golden eagles and didn't allow them to nest which took away a species that preyed upon island foxes causing their population to increase.

Part B

Describe one way the island ecosystem benefited from the removal of feral pigs. Explain how removing feral pigs helped to increase the island fox population.

Invasive feral pigs ate the plants or producers on the island which left little food for primary consumers such as mice and grasshoppers. These primary consumers are crucial in the island foxes' diet so when feral pigs began to be removed, the populations of these primary consumer increased and the foxes had more food to grow its population.

Part C

Other than reintroducing bald eagles and removing feral pigs, describe another action that humans could take to increase the island fox population. Explain how this action would increase the size of the island fox population.

Humans could remove skunks as they compete with the island foxes for food sources, therefore removing that species would leave even more food for island foxes allowing logistic growth in their species.

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Score Point 3B**This question has three parts.**

Humans helped increase the island fox population on Santa Cruz Island by removing feral pigs and golden eagles from the island and by reintroducing bald eagles.

Part A

Explain how reintroducing bald eagles helped to increase the island fox population.

Reintroducing bald eagles helped to increase the population of the island fox. The bald eagles chase golden eagles away, and golden eagles prey on island foxes. With bald eagles back, the population of the island fox can regulate again because they're no longer being preyed on.

Part B

Describe one way the island ecosystem benefited from the removal of feral pigs. Explain how removing feral pigs helped to increase the island fox population.

One way the island ecosystem benefited from the removal of feral pigs was the increase in population of the cactus plants and Manzanita trees. Removing feral pigs increased the island fox population because the island fox also eats cactus plants, so they had more food to eat.

Part C

Other than reintroducing bald eagles and removing feral pigs, describe another action that humans could take to increase the island fox population. Explain how this action would increase the size of the island fox population.

Another action that humans could take to increase the size of the island fox population would be to plant more cactus plants or Manzanita trees. This would increase the island fox population because the mouse and grasshopper population would also increase. This would help the island fox because it would have more resources like mice, cactus plants, and grasshoppers due to the new producers.

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Score Point 2**This question has three parts.**

Humans helped increase the island fox population on Santa Cruz Island by removing feral pigs and golden eagles from the island and by reintroducing bald eagles.

Part A

Explain how reintroducing bald eagles helped to increase the island fox population.

Unlike their Golden counterparts, Bald Eagles do not prey on Island Foxes, instead fishing. This allows the foxes to live longer than to lower predation

Part B

Describe one way the island ecosystem benefited from the removal of feral pigs. Explain how removing feral pigs helped to increase the island fox population.

Feral Pigs were invasive, and wrecked havoc on local ecosystems. One of these ways was becoming consumers of cacti, a plant which was also a food source for Island Foxes. When they were removed from the ecosystem, there was less competition for the cacti, allowing the foxes a larger share

Part C

Other than reintroducing bald eagles and removing feral pigs, describe another action that humans could take to increase the island fox population. Explain how this action would increase the size of the island fox population.

Humans could also institute breeding programs for Island Foxes, akin to those for many other threatened species. This would allow for higher survival rates in infancy, and controlled release into the wilderness, as well as easier population monitoring

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Score Point 1**This question has three parts.**

Humans helped increase the island fox population on Santa Cruz Island by removing feral pigs and golden eagles from the island and by reintroducing bald eagles.

Part A

Explain how reintroducing bald eagles helped to increase the island fox population.

The reintroducing of the bald eagles increased the Island Foxes population is because Bald eagles didn't feed on the foxes, The golden eagles did.

Part B

Describe one way the island ecosystem benefited from the removal of feral pigs. Explain how removing feral pigs helped to increase the island fox population.

The removal of the feral pigs increased the Island Foxes Population is because the feral pigs dug up and ate native plants, including cactus plants and manzanita Trees.

Part C

Other than reintroducing bald eagles and removing feral pigs, describe another action that humans could take to increase the island fox population. Explain how this action would increase the size of the island fox population.

What the people could have also done to increase the Island foxes population is to Grow more Manzanita Trees and cactus plants, it would increase the population because the mice feed on the plants and the foxes feed on the mice, so more plants mean more mice, more mice means more food for the foxes.

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Score Point 0**This question has three parts.**

Humans helped increase the island fox population on Santa Cruz Island by removing feral pigs and golden eagles from the island and by reintroducing bald eagles.

Part A

Explain how reintroducing bald eagles helped to increase the island fox population.

Reintroducing bald eagles helped increase the island fox population because the foxes learned how to adapt. It also made humans get rid of the feral pigs.

Part B

Describe one way the island ecosystem benefited from the removal of feral pigs. Explain how removing feral pigs helped to increase the island fox population.

All the other animals began to thrive again once the pigs were removed.

Part C

Other than reintroducing bald eagles and removing feral pigs, describe another action that humans could take to increase the island fox population. Explain how this action would increase the size of the island fox population.

Humans could stop them from being hunted and eaten by other animals and also other humans.

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