

2022 MCAS Sample Student Work and Scoring Guide

Grade 8 Science and Technology/Engineering Question 15: Constructed-Response

Reporting Category: Life Science

Practice Category: Evidence, Reasoning, and Modeling

Standard: [7.LS.2.1](#) - Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.

Item Description: Analyze a food web to describe and explain the ecological relationship between two organisms and explain how changes to the populations of organisms affect the population sizes of other organisms.

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

Scoring Guide

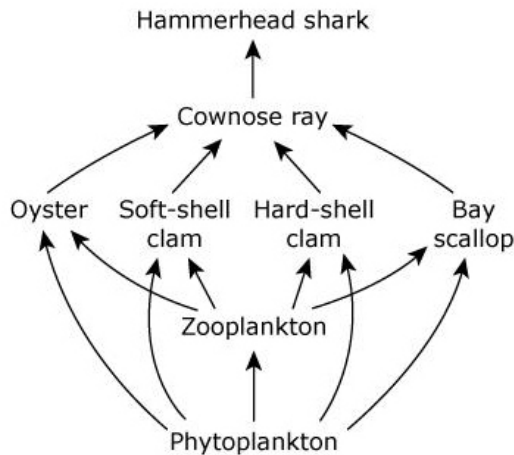
Select a score point in the table below to view the sample student response.

Score*	Description
3A	The response demonstrates a thorough understanding of the effect of scarce resources on the size of populations in an ecosystem. The response correctly identifies the ecological relationship between cownose rays and oysters in this ecosystem and clearly explains the reasoning. The response clearly describes what would happen to the size of the cownose ray population if there were a large decrease in the phytoplankton population and clearly explains the reasoning. The response also clearly describes what would happen to the hammerhead shark population if the cownose rays were removed from the ecosystem and clearly explains the reasoning.
3B	
2	The response demonstrates a partial understanding of the effect of scarce resources on the size of populations in an ecosystem.
1	The response demonstrates a minimal understanding of the effect of scarce resources on the size of populations in an ecosystem.
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

Sharks are large fish that live in the ocean.
Hammerhead sharks are a part of a marine ecosystem,
as shown in the food web.



This question has three parts.

Cownose rays are an important part of the marine ecosystem.

Part A

Identify the ecological relationship (competitive, parasitic, or predatory) between cownose rays and oysters in the ecosystem. Explain your reasoning.

Predatory, because Cownose rays hunt and prey on Oysters, eating them to survive.

Part B

Describe what would most likely happen to the size of the cownose ray population (increase, decrease, or stay the same) if there were a large decrease in the phytoplankton population in the ecosystem. Explain your reasoning.

A decrease because the Phytoplankton is a food source to almost all of the Cownose's food sources, meaning they decrease in population and that in turn gives the Cownose less food, decreasing the size of its population.

Part C

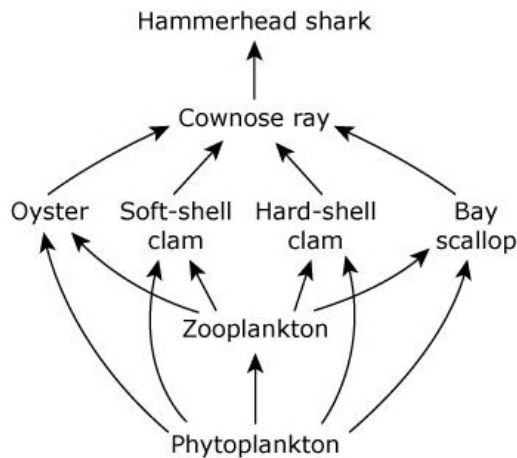
Based on the food web, describe what would most likely happen to the hammerhead shark population if the cownose rays were removed from the ecosystem. Explain your reasoning.

The Hammerhead shark population would falter as the Cownose seems to be its only source of food according to this food web, meaning they'd lose the food source they use to survive and thrive.

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Score Point 3B

Sharks are large fish that live in the ocean. Hammerhead sharks are a part of a marine ecosystem, as shown in the food web.



This question has three parts.

Cownose rays are an important part of the marine ecosystem.

Part A

Identify the ecological relationship (competitive, parasitic, or predatory) between cownose rays and oysters in the ecosystem. Explain your reasoning.

Predatory. This is because cownose rays eat oysters.

Part B

Describe what would most likely happen to the size of the cownose ray population (increase, decrease, or stay the same) if there were a large decrease in the phytoplankton population in the ecosystem. Explain your reasoning.

It would decrease. If the phytoplankton population goes down, the zooplankton will also decrease from a lack of food. As well as the zooplankton, the oysters, clams, and scallops will decrease from a lack of food. As a result, the cownose ray will not have food to eat, thus making a decrease in population.

Part C

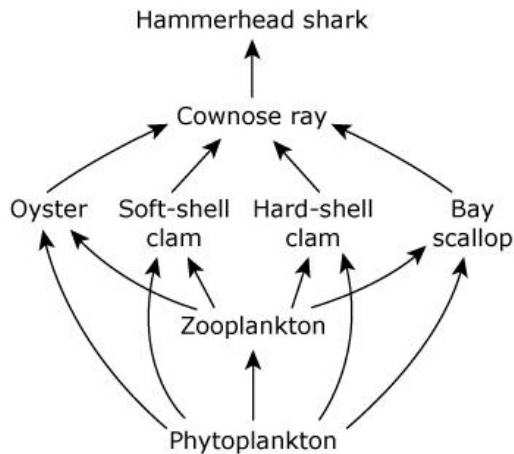
Based on the food web, describe what would most likely happen to the hammerhead shark population if the cownose rays were removed from the ecosystem. Explain your reasoning.

They would have an increasingly large decrease, as their only food source was the cownose ray.

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Score Point 2

Sharks are large fish that live in the ocean.
Hammerhead sharks are a part of a marine ecosystem,
as shown in the food web.



This question has three parts.

Cownose rays are an important part of the marine ecosystem.

Part A

Identify the ecological relationship (competitive, parasitic, or predatory) between cownose rays and oysters in the ecosystem. Explain your reasoning.

They are in a predatory relationship, as the cownose ray eats oysters.

Part B

Describe what would most likely happen to the size of the cownose ray population (increase, decrease, or stay the same) if there were a large decrease in the phytoplankton population in the ecosystem. Explain your reasoning.

I think that the cownose ray population would increase because phytoplankton are the source of food for the cownose ray's food.

Part C

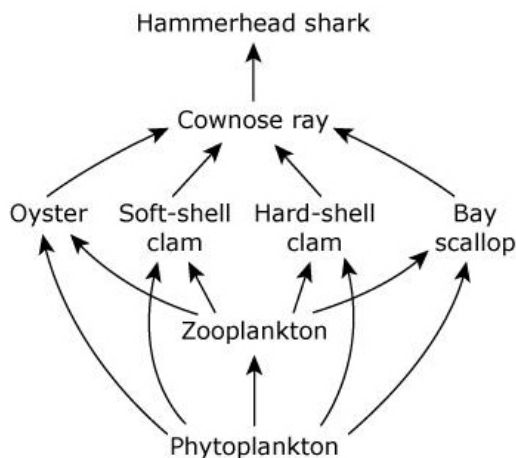
Based on the food web, describe what would most likely happen to the hammerhead shark population if the cownose rays were removed from the ecosystem. Explain your reasoning.

The hammerhead sharks would probably die off, as according to the food web they only eat cownose rays.

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Score Point 1

Sharks are large fish that live in the ocean. Hammerhead sharks are a part of a marine ecosystem, as shown in the food web.



This question has three parts.

Cownose rays are an important part of the marine ecosystem.

Part A

Identify the ecological relationship (competitive, parasitic, or predatory) between cownose rays and oysters in the ecosystem. Explain your reasoning.

The ecological relationship between Cownose rays and Oysters are predatory. Oysters are eaten by Cownose rays which must mean that an Oyster is a Cownose rays pray.

Part B

Describe what would most likely happen to the size of the cownose ray population (increase, decrease, or stay the same) if there were a large decrease in the phytoplankton population in the ecosystem. Explain your reasoning.

The size of the cownose ray would most likely stay the same. Many of what a cownose ray eats eats zooplankton and phytoplankton, so a decrease in phytoplankton would mean more zooplankton are eaten.

Part C

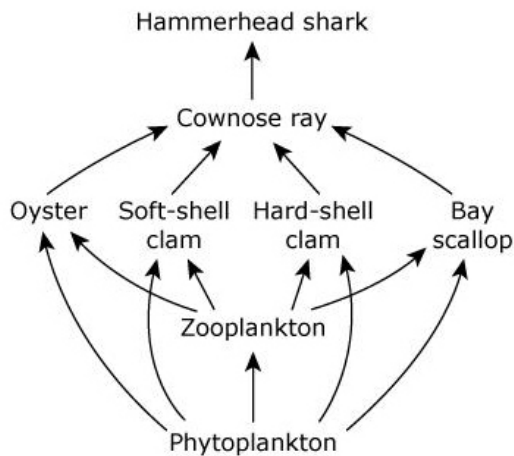
Based on the food web, describe what would most likely happen to the hammerhead shark population if the cownose rays were removed from the ecosystem. Explain your reasoning.

Hammerhead sharks would start eating oysters and bay scallops, as that was what was eaten by cownose rays.

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Score Point 0

Sharks are large fish that live in the ocean.
Hammerhead sharks are a part of a marine ecosystem,
as shown in the food web.



This question has three parts.

Cownose rays are an important part of the marine ecosystem.

Part A

Identify the ecological relationship (competitive, parasitic, or predatory) between cownose rays and oysters in the ecosystem. Explain your reasoning.

The relationship between cownose rays and oysters is parasitic because Oyster eats Cownose rays but Cownose rays don't eat Oyster.

Part B

Describe what would most likely happen to the size of the cownose ray population (increase, decrease, or stay the same) if there were a large decrease in the phytoplankton population in the ecosystem. Explain your reasoning.

The population would stay the same because phytoplankton all in the bottom of the food web, and they don't eat cowose rays.

Part C

Based on the food web, describe what would most likely happen to the hammerhead shark population if the cownose rays were removed from the ecosystem. Explain your reasoning.

The population of the hammerhead shark would increase because there wouldn't be cownose eating them for food.

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