

Kelp Forest Connections

How biodiversity supports ecosystem stability, sustainability, and organism health

8.12.C “describe how biodiversity contributes to the stability and sustainability of an ecosystem and the health of the organisms within the ecosystem.”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline two details that show different organisms have roles in the kelp forest. Number 1 and 2 beside two details that explain how biodiversity helps the ecosystem keep functioning or recover.

A Forest Beneath the Waves

- ① At Graystone Cove, a kelp forest grows in cold, shallow water. Giant kelp provides shelter for rockfish, sea otters, crabs, snails, and many smaller animals. Sea urchins eat kelp, while sea otters eat sea urchins. Kelp also gives off oxygen and slows waves near the shore. This variety of species, genes, and habitats is biodiversity. Each population has a role, so energy and materials move through many connected feeding relationships within this busy coastal ecosystem.
- ② One winter, a disease greatly reduced the sea otter population. With fewer otters, more sea urchins survived and grazed heavily on kelp. Some parts of the forest became bare. However, the cove still held several kinds of kelp, algae, and fish that used different foods and spaces. These organisms continued to provide cover and food. Because many species could perform related jobs, the ecosystem was more likely to keep functioning during the sudden winter change.
- ③ Over time, a stable kelp forest can support organisms' health. Fish find hiding places, young animals find nursery areas, and predators find prey. Diverse plants and algae capture energy in different seasons and provide food for different grazers. When one food source becomes scarce, some consumers may use another source. Biodiversity does not prevent every loss, and an ecosystem can still be damaged by pollution or warming water. Yet protecting many native species and their habitats helps the forest recover and continue supporting life.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Explain how fewer sea otters caused some parts of the kelp forest to become bare.

2 What two details show that biodiversity helped the cove keep functioning after the otter population fell?

3 How can biodiversity support the health of organisms in a kelp forest? Use two examples from the passage.

4 Why does biodiversity make an ecosystem more sustainable but not guarantee that it will avoid damage?

3 YOUR TURN _____ Your own words

Imagine a pond ecosystem during a drought. In 3 to 4 sentences, describe how biodiversity could help the pond keep functioning and support organism health. Include the roles of at least two kinds of organisms and one health benefit.

PART 1 • READ AND MARK

Underline two details that show different organisms have roles in the kelp forest. Number 1 and 2 beside two details that explain how biodiversity helps the ecosystem keep functioning or recover. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Explain how fewer sea otters caused some parts of the kelp forest to become bare.	With fewer sea otters, more sea urchins survived. The urchins grazed heavily on kelp, leaving some areas bare.
2	What two details show that biodiversity helped the cove keep functioning after the otter population fell?	The cove still had several kinds of kelp, algae, and fish that used different foods and spaces. Many species could perform related jobs and continued providing cover and food.
3	How can biodiversity support the health of organisms in a kelp forest? Use two examples from the passage.	Biodiversity provides hiding places and nursery areas for fish and young animals. It also provides food in different seasons and other food sources when one source is scarce.
4	Why does biodiversity make an ecosystem more sustainable but not guarantee that it will avoid damage?	Many native species and habitats can help an ecosystem recover and continue supporting life. Pollution or warming water can still damage the ecosystem.

PART 3 • YOUR TURN (SAMPLE ANSWER)

During a drought, low water levels may reduce the algae in a pond. Tadpoles can eat algae, while dragonfly larvae eat small aquatic insects. If algae become scarce, some tadpoles may use other plant material, and fish may still find insect prey. These different food choices can help animals keep getting energy and stay healthy until wetter conditions return.

Accept scientifically sound explanations that connect a variety of species or food sources to continued ecosystem functions, recovery, or organism health. For the open response, students should name at least two organism roles and clearly explain a health benefit connected to biodiversity.