Reef Connections

Trace feeding niches and symbiotic relationships on a coral reef.

MAQ.4.3 "Determine the niches within trophic levels in the aquatic ecosystems by creating food webs and researching the symbiotic relationships that exist."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the producers, circle the consumers, and number four organisms in one feeding path from a producer to a reef shark.

Who Depends on Whom?

1. At a Caribbean reef, sunlight reaches turf algae on rocks and phytoplankton drifting in the water. These producers make food through photosynthesis. Parrotfish scrape turf algae, while zooplankton feed on phytoplankton. Small snappers catch zooplankton, and groupers hunt small snappers and young parrotfish. Reef sharks sometimes eat groupers. In a food web, each arrow points from food to the organism that eats it. Parrotfish and zooplankton are both primary consumers, but they use different food sources and occupy different places on the reef. Their niches include what they eat, where they feed, and how they interact with other species.

2. Coral polyps add another path to this web. They catch zooplankton with tentacles, and butterflyfish bite living coral polyps. Groupers can eat butterflyfish. Many reef-building corals also house tiny algae inside their tissues. The algae use sunlight to make sugars that help feed the coral. The coral provides the algae with shelter and materials needed for photosynthesis. Both benefit, so this partnership is mutualism. The algae are producers, but the coral is not a producer. Because coral also catches zooplankton, it can draw energy from two sources. This gives the coral a distinct feeding niche.

3. A grouper can be both hunter and host. Tiny parasites may feed on its skin or gills, harming the fish while gaining food. Cleaner shrimp sometimes remove and eat these parasites at reef cleaning stations. The shrimp gains a meal, and the grouper loses parasites, another example of mutualism. The shrimp's feeding niche differs from the grouper's even though both eat animals. To study such links, researchers watch feeding behavior, inspect stomach contents, and record which partners benefit or suffer. A food-web arrow shows a feeding link, not every interaction. Add a separate label for mutualism or parasitism so the web does not confuse partnership with energy flow.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace a feeding path from phytoplankton to a reef shark. Which organisms in your path are primary and secondary consumers?

2. Parrotfish and zooplankton occupy the same trophic level. How do their feeding niches differ?

3. What are two sources of energy for coral polyps? Explain how the coral and the algae inside it both benefit.

4. Compare the cleaner shrimp's and parasites' relationships with a grouper. How does each get food, and how is the grouper affected?

3 YOUR TURN

Your own words

Draw a reef food web with at least six organisms from the passage, including two paths that join at the grouper. Use arrows from food to eater, label one mutualistic partnership separately, then write two sentences predicting an effect of fewer reef sharks using your web.

ANSWER KEY

Reef Connections

HIGH SCHOOL · MAQ.4.3

PART 1 · READ AND MARK

Underline the producers, circle the consumers, and number four organisms in one feeding path from a producer to a reef shark. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace a feeding path from phytoplankton to a reef shark. Which organisms in your path are primary and secondary consumers?	**Phytoplankton → zooplankton → small snapper → grouper → reef shark. Zooplankton are primary consumers, and small snappers are secondary consumers.**
2	Parrotfish and zooplankton occupy the same trophic level. How do their feeding niches differ?	**Both are primary consumers, but parrotfish scrape turf algae from rocks while zooplankton feed on drifting phytoplankton.**
3	What are two sources of energy for coral polyps? Explain how the coral and the algae inside it both benefit.	**Coral polyps catch zooplankton and receive sugars made by the algae. The algae get shelter and materials needed for photosynthesis from the coral.**
4	Compare the cleaner shrimp's and parasites' relationships with a grouper. How does each get food, and how is the grouper affected?	**Cleaner shrimp eat parasites, benefiting both shrimp and grouper, so their relationship is mutualism. Parasites feed on and harm the grouper, so their relationship is parasitism.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Food web: phytoplankton → zooplankton → small snapper → grouper → reef shark; turf algae → parrotfish → grouper. Mutualism: grouper ↔ cleaner shrimp.
With fewer sharks, more groupers may survive and eat more small snappers. That could leave more zooplankton because fewer snappers eat them.

Accept other food webs supported by the passage if arrows point from food to eater and two paths join at the grouper. Predictions should follow a feeding path in the student's web; the mutualistic partnership must be labeled separately from feeding arrows.