Day & Night in a Coral Reef

Name:

Period:

SPONGE$_a$
SEA FAN$_b$
ELKHORN CORAL$_c$
STAR CORAL$_d$
BRAIN CORAL$_e$
PLATE CORAL$_f$

DAY SHIFT☆
GROUPER$_g$
BUTTERFLYFISH$_h$
DAMSELFISH$_i$
PARROTFISH$_j$
CLEANER SHRIMP$_k$

NIGHT SHIFT☆
SQUIRRELFISH$_l$
GRUNT$_m$
MORAY EEL$_n$
FEATHER STAR$_o$
SPINY LOBSTER$_p$
SEA URCHIN$_q$

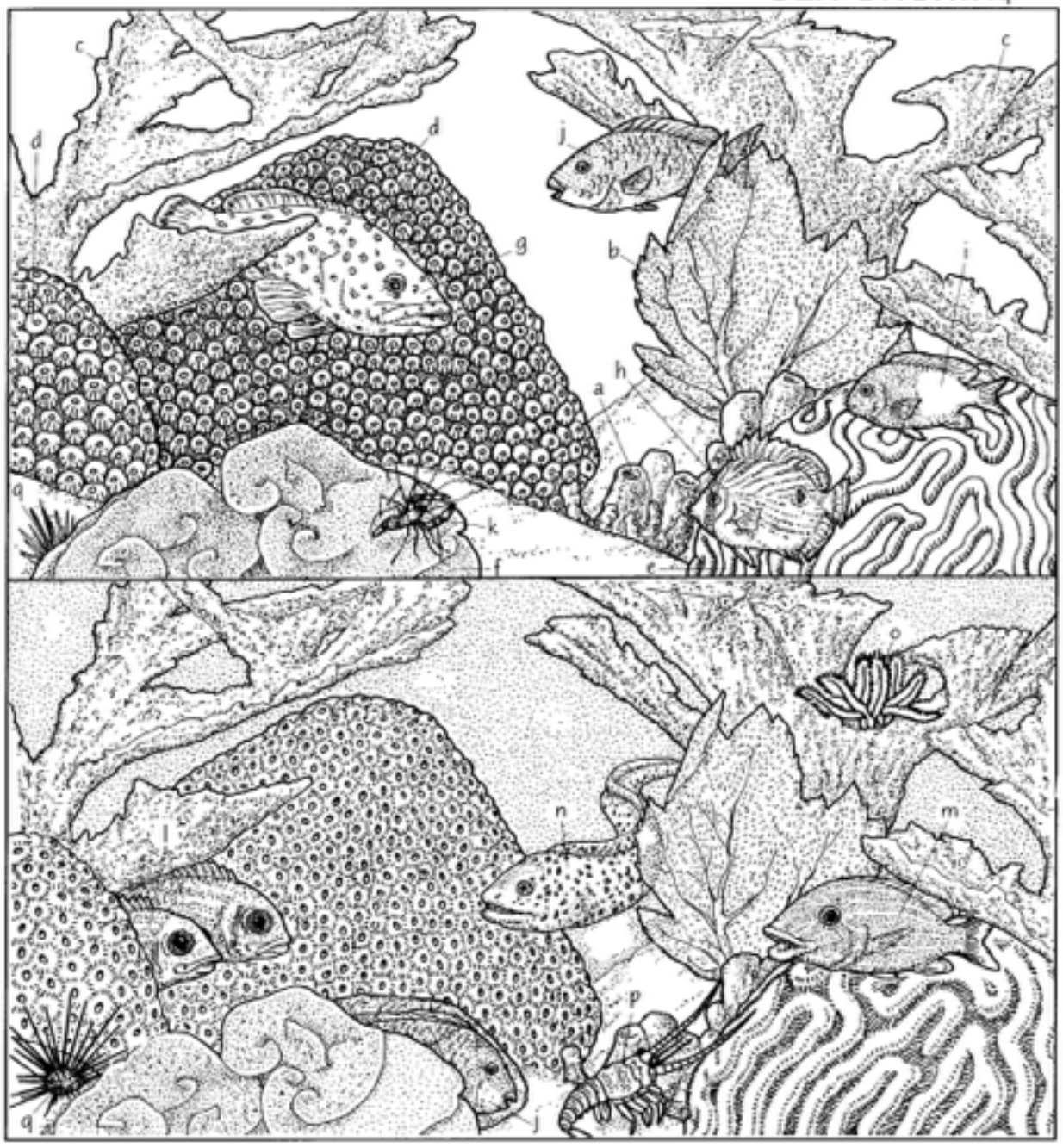

diagram from The Marine Biology Coloring Book (2000) by Thomas M. Niesen

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Follow the directions below to color-code the diagram and to answer the questions. Use colored pencils, and check off each box ☑ as you finish that part of the instructions.

For this exercise, you will be analyzing how certain body parts and behaviors of organisms help them to successfully survive during the day or the night.

Take a look at the diagram. The top drawing shows the activity of certain organisms during the daytime in a coral reef. The bottom drawing shows the same area of the reef, only this time at night. Compared to the dark rocky coasts of California, coral reefs are extremely colorful.

1. Let's start by looking at the different organisms that remain attached to one spot on the reef. Because they live in just one spot and do not move, they are referred to as *sedentary.* As they will not move around between the day and the night, make sure to color them in both the top and bottom diagrams. The first sedentary organism is a sponge (*a*) . These are tube shaped, which allows water to flow through the center, where little cells can grab food as it floats by. Use purple to color both the sponges □ and their label □ .

How does the tube shape of a sponge help it to survive?

2. Next is a sea fan (*b*). These are made of lots of little tiny polyps (similar in structure to a sea anemone). As the flat sea fan is moved by water currents, little bits of food float by and are grabbed by the tentacles of the polyps. Use orange to color both the sea fan □ and its label □ .

How does the flat shape of a sea fan help it to survive?

3. The coral in a reef is made by hundreds or thousands of little creatures attached to each other. Tiny polyps attach to each other by secreting (making) a hard skeleton on the outside of their bodies. Each of these skeletons attaches to the one next to it, making sort of a giant apartment complex. As many coral polyps contain cells of algae growing in them, they need to be close to the surface in order to grab sunlight for photosynthesis. In return for protecting the algae cells, the polyps benefit by getting oxygen and nutrients from the algae. This extra energy, combined with whatever food the polyp tentacles can grab, lets the coral grow its protective skeleton.

How do coral polyps and algae help each other to survive?

4. The first kind of coral in the diagram is called elkhorn coral (*c*), named because it looks like the antlers of an elk. If pieces of this coral break off during a storm, the broken piece can attach itself and begin to grow in a new location. This coral grows close to the surface, as it contains a lot of algae. Use light brown or tan to color both the elkhorn coral □ and its label □ .

Why does elkhorn coral grow so close to the surface of the ocean?

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5. Deeper down, star coral (*d*) and brain coral (*e*) can be found. These corals are made of much larger polyps, which protect themselves from predation by only coming out at night. Then, their food (zooplankton) is also swimming around, so the polyps can grab a meal with their tentacles. Use gray to color the star coral □ and its label □ , and brown to color the brain coral □ and its label □ .

Compare the depth of the star and brain coral with where elkhorn coral is found. Would you expect star and brain coral to have more or less algae living with its polyps? Why?

6. The final piece of coral to learn about is called plate coral (f). In order to gather as much sunlight as possible where it lives, it grows in a wide, flat shape. Leave the plate coral white □ , along with its label □ .

Why is plate coral so flat?

7. Time to look at the swimming things that call a coral reef home. Start by coloring the label DAY SHIFT in black □ . Color the grouper (*g*) and its label orange □ . Color the butterfly fish (h) and its label yellow □ . Color the damselfish (i) and its label light gray □ . Color the parrotfish (j) and its label bright blue □ .

Which type of coral would be best for providing camouflage for the damselfish? Why?

8. One kind of shrimp has figured out how to get food by working with the fish. The cleaner shrimp (k) stands on coral where fish can see it clearly. The shrimp then waves its white antennae around, and the fish swims up next to it. The shrimp then moves over the fish's body, removing and eating any parasites it can find. It even cleans inside the fish's mouth! Reef fish quickly learn how nice it is to be parasite free, so they rarely eat the cleaner shrimp. Color the dark stripes on the cleaner shrimp with red □ , and color every other letter of the label with red as well □ .

How do cleaner shrimp and reef fish help each other?

9. As night descends on the coral reef, the animals that were out during the day find a safe place to rest. The parrotfish (j) actually secretes a slimy covering while it rests. Who would want a mouthful of that?!?

Why is the parrotfish safe while it sleeps?

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10. As it gets darker, a different set of animals come out to feed. Color the label NIGHT SHIFT in black □ . As there is much less light, most of these animals have larger eyes, which make it easier to see in the dark. Color the squirrelfish (l) and its label orange □ . Color the grunts (m) and their label yellow □ . Color the moray eel (n) and its label green and brown □ .

Why do the animals that come out at night have bigger eyes compared to the ones that are active during the day?

11. Several invertebrates come out at night as well. The feather star (o) is sort of a cross between a star fish and a sea urchin. It uses its tube feet to crawl up to a location where it can wave about and catch food that floats by. The tube feet then shove the captured food down a system of grooves until it reaches the mouth. Color the feather star □ and its label with a bright color of your choosing □ .

How do the tube feet of the feather star help it to eat?

12. Another invertebrate that feels safer at night is the spiny lobster (p). As the reef gets darker, the lobster comes out from the crack or from under a chunk of coral, and searches for food. Color the lobster □ and its label green □ .

How does the spiny lobster stay safe during the day?

13. The long-spined sea urchin (q) hides in much the same way during the day as the spiny lobster. It jams itself into a crack, leaving only its sharp spines poking out. At night, it comes out and crawls over the reef looking for algae to eat. Color the sea urchin □ and its label dark gray □ .

What adaptation of the sea urchin keeps it safer during both the day and the night?

14. To finish your diagrams, use gray to LIGHTLY color over the lower picture □ . This will help to mute the brighter colors.