

Source: Coral Reef Teacher's Guide, produced by the World Wildlife Fund, 1250 Twenty-Fourth St. NW, Washington, DC 20037-1175. Used with permission.

38. THE CORAL REEF COMMUNITY

Goal: to familiarize students with important members of a Caribbean coral reef ecosystem, and the role they play there.

Objectives:

1. Students will be able to name at least six animals common to Caribbean coral reef ecosystems.
2. Students will be able to explain why some of these animals are restricted to certain parts of reef systems.
3. Students will be able to describe energy transfer from the sun, to plants, to plant-eaters, and finally to animal-eaters.
4. Students will be able to define the term "food web," and ecosystem.

Materials Required:

Coral Reef Clue Cards (following procedure)
Coral Reef Cards (illustrated cards following Coral Reef Clue Cards)
(Cut out and paste both sets of cards to light cardboard.)
Thumb Tacks (about 30)
Bulletin Board
Large piece of newsprint with Reef Outline drawn upon it
Blackboard and chalk

Student Background:

Hundreds of different types of plants and animals live in coral reefs—certainly more than we could learn about here. In the following activities, we will learn about members of important groups of reef-dwellers and reef-neighbors.

First, we will just get to know them, finding out about where they live on the reef, and interesting details of the way they live.

Next, we will investigate their eating habits. You know that you must eat food in order to grow and to have enough energy to go to school, play, and just to be healthy. Think for a moment about that phrase "to have enough energy." What do people mean when they talk about that kind of "energy"?

(Discuss.)

All living things, plants and animals alike, need energy. Energy is the ability to do any kind of work—to move, to grow, even to think takes energy.

If energy is so important, where does it come from? (Discuss.)

We get it from the plants and animals we eat. But where do animals and plants get energy from?

Animals get energy from eating plants and animals, just as do we. But what about plants? They don't eat. Does anyone know where plant energy comes from? (Discuss.) They too need energy for growing and reproducing. When you eat a mango, you are eating energy that the mango plant has transformed into food.

Plants harvest energy from the sun. That's where the whole business of energy begins—for us, and for the creatures of the reef. Plants change the sun's energy into plant tissues—leaves, stems, or seaweeds. Large numbers of animals eat those plants, and other animals eat them, in turn.

Some scientists organize communities of living things according to "who-eats-who." This type of organizing tells them how energy from the sun is transferred among members of natural communities such as coral reefs.

There are three main groups in this system:

- Animal-eaters or Carnivores. These animals prey only upon other animals.
- Plant-eaters or Herbivores. These animals eat plants only.
- Plant-and-animal-eaters or Omnivores. These animals have a mixed diet of both plants and animals.

Can you think of examples of these groups? (Discuss.)

Today's activity looks at the complex web of food and eating relationships that exist in a coral reef. In fact, scientists call these relationships a food web. You are going to make a coral reef food web in the classroom, after you learn some of the creatures that live there.

The food web you make here will not be totally realistic. This is because you will not learn the amounts of various animals and plants that live in a coral reef. In the ocean, there are relatively larger numbers of small bottom dwellers that eat plants, small fishes of all kinds, and the plants themselves. Very large animals, such as sharks, have no other creatures that eat them—unless we are talking about baby sharks. Extremely small sharks probably get eaten by many large fish. It is hard to show such a complex food web in your classroom. But, you will get the idea of how food webs work. That's the most important idea.

During this activity, remember this little poem written in the 1800s. The poet sums up the idea of a food web in a funny way*. (Ad infinitum is the Latin phrase meaning "and so on, forever.")

Great Fleas have little fleas upon their back to bite'em,
And little fleas have lesser fleas, and so, ad infinitum.
And the great fleas themselves in turn, have greater fleas to go on,
While these again have greater still, and greater still, and so on.

**from A Budget of Paradox, Augustus Morgan, 1806-1871*

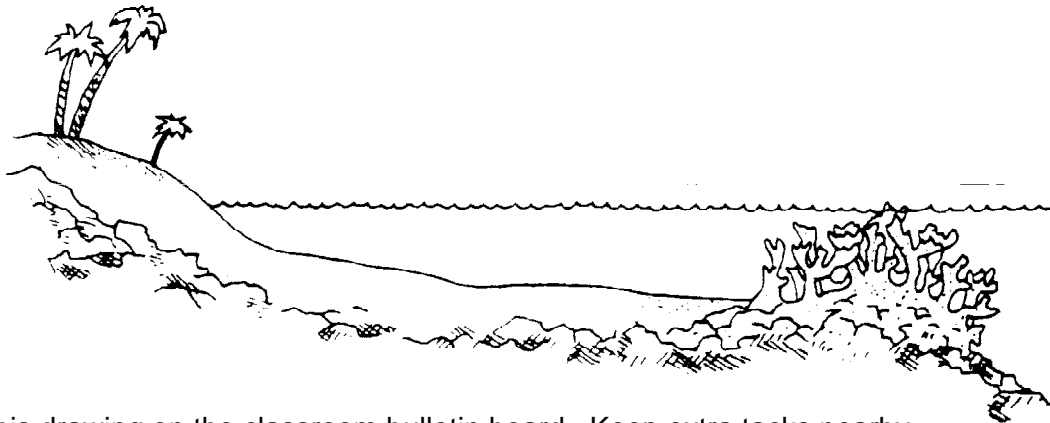
Procedure:

1. Prior to activity assign background reading to students. [E.g., Coral Reef Coloring Book written and illustrated by Katherine Orr, © 1988, Stemmer House Publishers, Inc. This coloring book is derived from a project funded by World Wildlife—U.S. Encourage students to color the illustrations.]

Cut out the Coral Reef Clue Cards (following procedure). Paste them to light cardboard.

Cut out the illustrated Coral Reef Cards (following Clue Cards). Paste them to light cardboard. Put them in a basket or box.

On a large sheet of newsprint, draw the outline of a coral reef system as shown below. Make a large drawing, so that there will be enough room to pin the Reef Cards in place. Color and add other details (no plants or animals on the cards) according to your artistic talents.



Post this drawing on the classroom bulletin board. Keep extra tacks nearby.

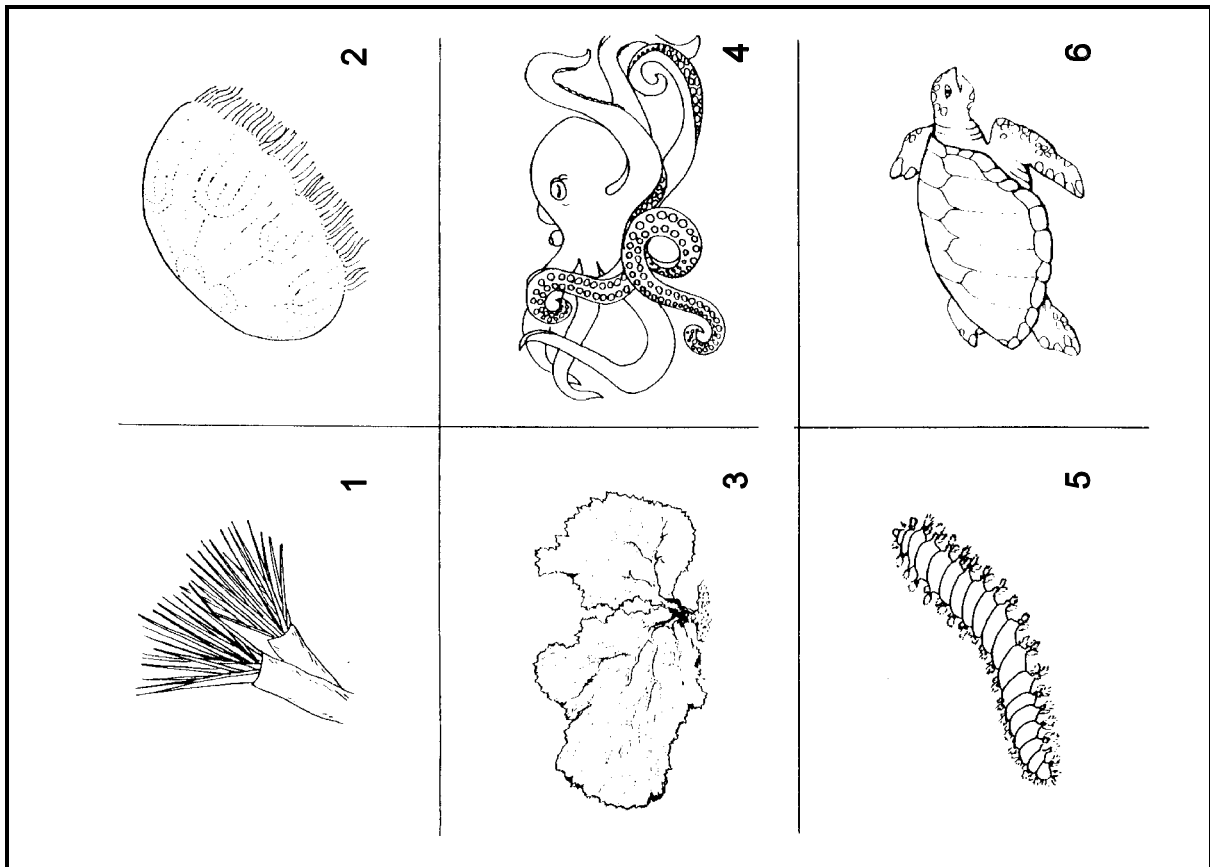
On the blackboard, write three headings: Plants, Animal-eaters, Plant-eaters, Plant-and-Animal-eaters.

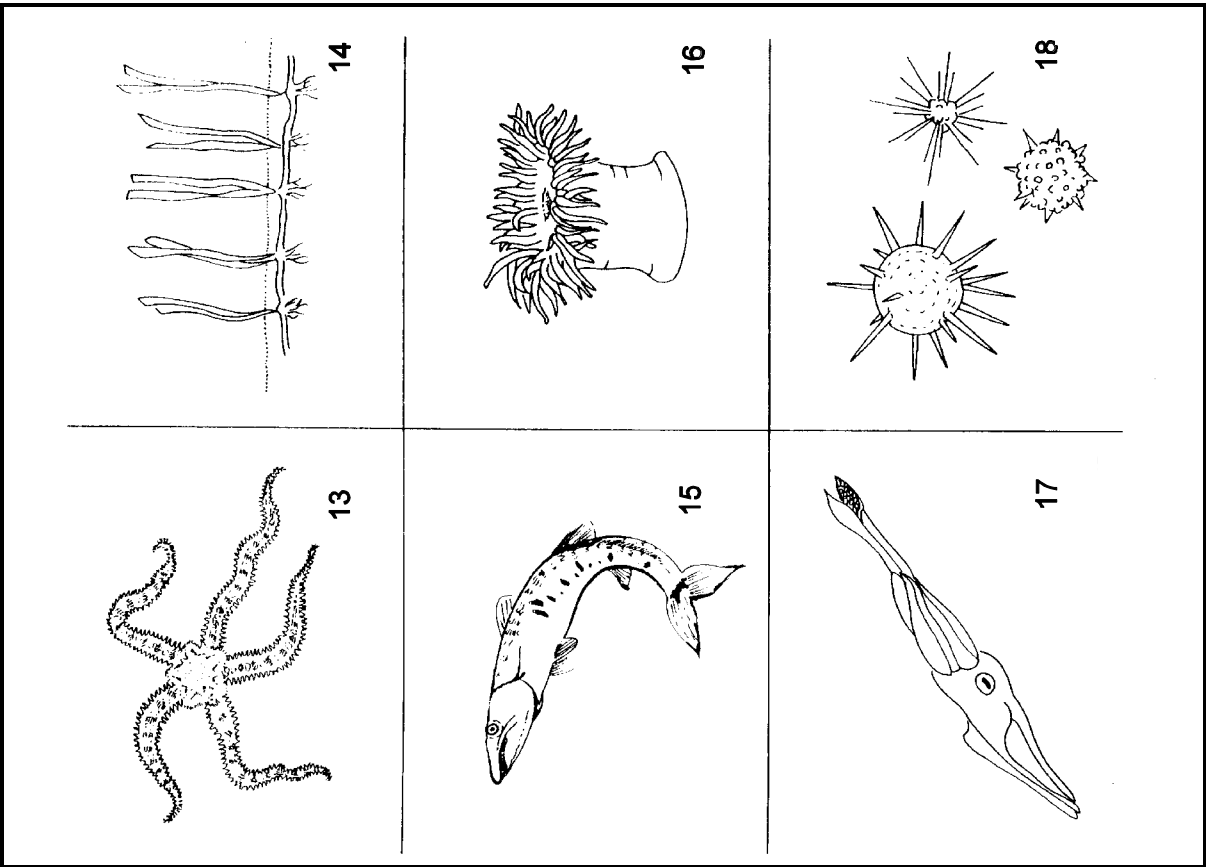
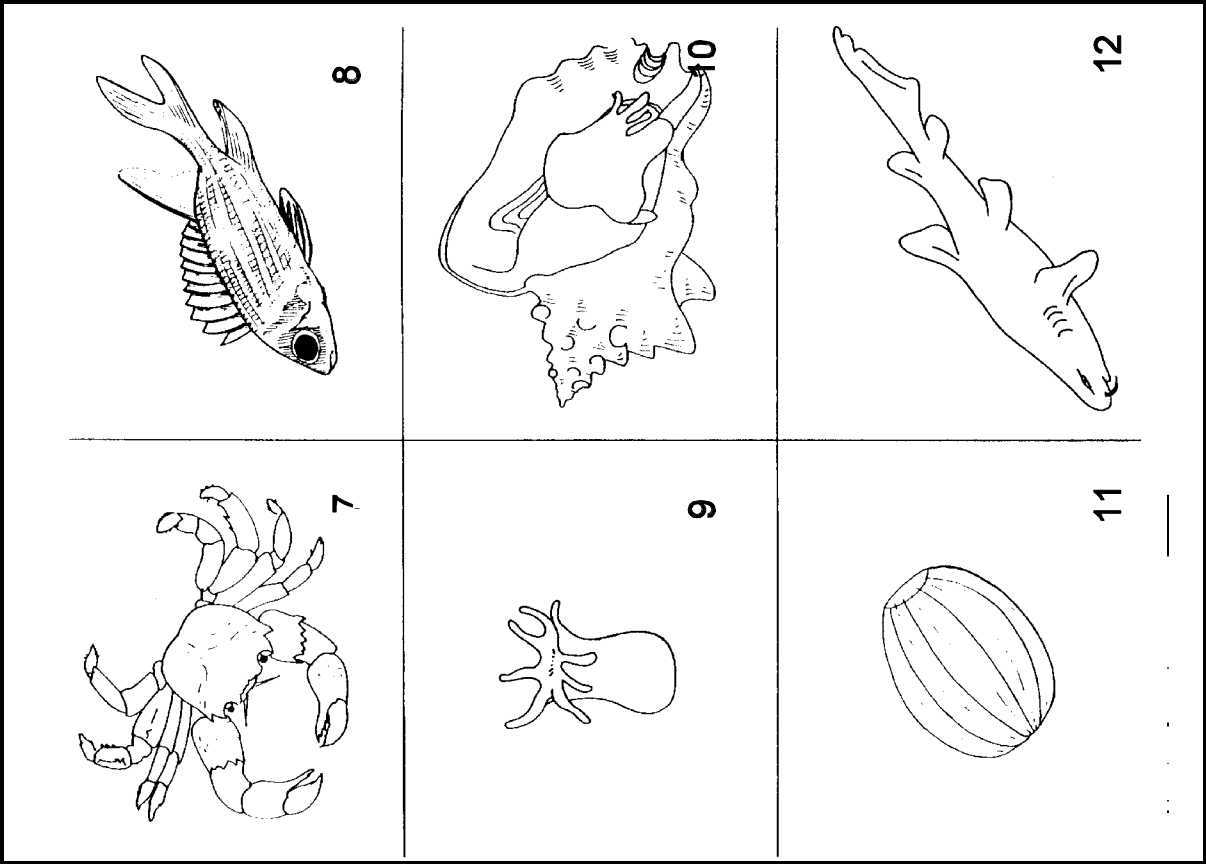
2. In class read Student Background (above) aloud.
3. Pass out Reef Cards, one per student. If there are cards left over, give some students two or more. If there are too few cards, have students team up.
4. Explain the outline of the reef you have drawn. Tell students that they must do three things with their cards:
 - (a) First, they must listen to you read clues, raising their hands as soon as the Coral Reef Clues describe the animal or plant on their Reef Card. You can call on students for the name of their animal or plant, or, for a livelier atmosphere, have students call out the name.
 - (b) Secondly, the first student to name the correct animal or plant must pin their card to the part of the reef community where their creature belongs. They should explain their reasoning to the class.
 - (c) Thirdly, they must write their animal or plant's name on the blackboard, underneath one of the headings you have written there.
Pause to make sure that everyone understands these instructions.
5. Begin reading Coral Reef Clues at random, one card at a time.
DO NOT READ THE LAST STATEMENT ON EACH CARD. Allow time for students to think about the clues. Repeat if necessary.
(Sometimes, several students will raise their hands at once. Tell them keep their hands up until they hear a clue which does not apply to their creature. This will probably happen several times. Students will soon realize that *your* clues proceed from general to specific information.)
6. When a student correctly identifies an animal or plant, have student show the class what it looks like, and then pin the card on the reef outline. The student should explain the position—why they place the card where they do—seaward beyond the reef, or between reef and shore, or on the reef itself. Also, tell the students to consider if the animal or plant is to be placed on the bottom, floating, or swimming in the water?
7. Give the student the corresponding Coral Reef Clues Card. Ask student to re-read the clues and decide which column on the blackboard applies to the creature on the card. Student should write the animal or plant's card under one column, explaining why to class.
Student should sit down again, keeping the Clue Card.
8. Then read another Reef Card Clue. Continue until all cards have been pinned on the reef outline.
If the game begins to lag, have students place cards on reef drawing, but write the plant or animal's name in the correct blackboard column while you go ahead and call new clue cards.
9. After all the plants and animals have been written in one of the three columns, discuss the following questions with the class:
 - What common characteristics are shared within each group?
 - Can we tell which group is the most important?
 - What would happen if all the animal-eaters disappeared from the reef?
 - What would happen if all the plant-eaters disappeared?
 - What would happen if all the plants died?
 - Can a coral reef be healthy if any of the groups disappeared?

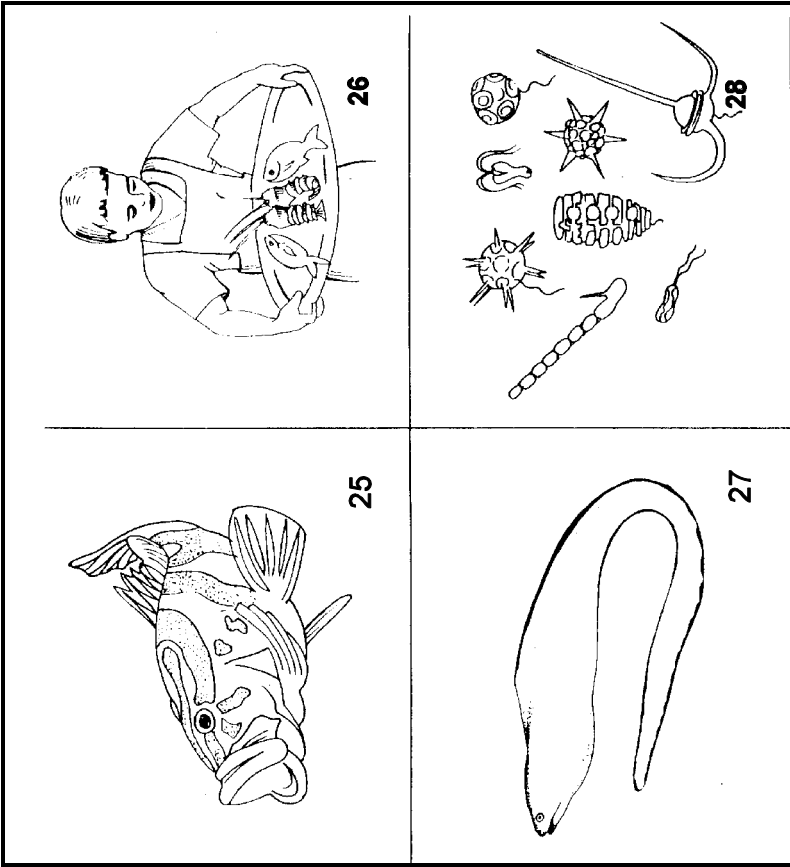
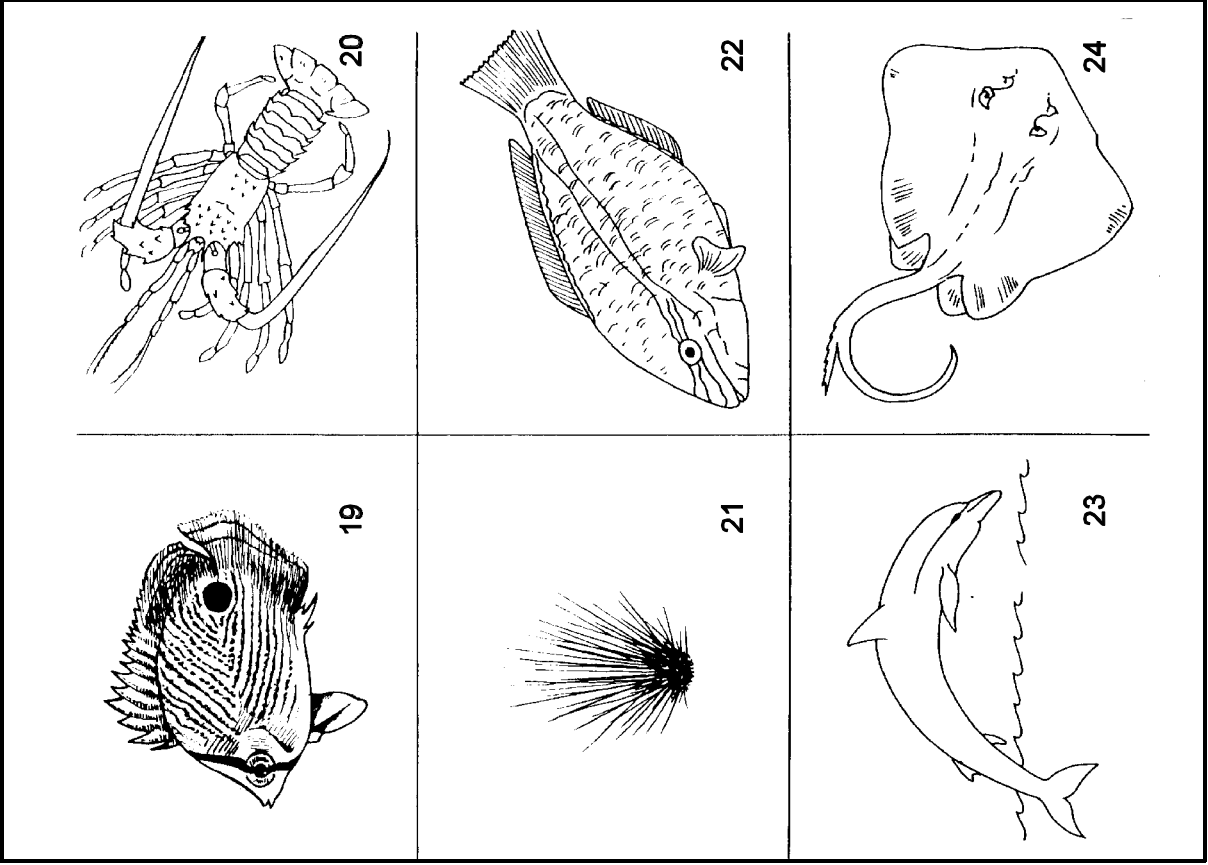
<p style="text-align: center;">1.</p> <p>I live in a hard tube that I build for myself. I draw myself quickly into my tube if I need to hide from some animal trying to eat me. With my gills, I catch tiny, drifting animals called "zooplankton." I have fine, thin gills on my head. They filter my food. I am a type of <u>worm</u> with bristles.</p> <p style="text-align: center;">I am a FEATHER DUSTER WORM.</p>	<p style="text-align: center;">2.</p> <p>I have a radial, or circular type body outline. I swim freely on the surface of the ocean. My stinging tentacles catch fish, which I eat. I am almost clear and transparent. Loggerhead turtles eat me.</p> <p style="text-align: center;">I am a MOON JELLYFISH.</p>
<p style="text-align: center;">3.</p> <p>I am a whole colony of animals, all alike. I grow into a fan-shaped creature that waves back and forth in the water. With my tentacles I catch small drifting animals called "zooplankton." Fireworms eat me. I am a type of "soft" coral.</p> <p style="text-align: center;">I am a SEA FAN.</p>	<p style="text-align: center;">4.</p> <p>I possess neither shell nor backbone. I crawl along the bottom and hide in cracks and holes of the reef. I can change color quickly, and hide in a cloud of inky water. I catch clams and snails. Eels and groupers eat me. I have eight arms.</p> <p style="text-align: center;">I am an OCTOPUS or SCUTTLE.</p>
<p style="text-align: center;">5.</p> <p>My body is divided into many segments. Each segment has legs below and bristles above. My bristles sting! I crawl around the reef and eat coral polyps. I am a type of <u>worm</u> with many bristles.</p> <p style="text-align: center;">I am a FIREWORM.</p>	<p style="text-align: center;">6.</p> <p>I have a backbone, four flipper-like legs, and a hard shell. I breathe air Lizards and snakes are closer relatives to me than fishes. I visit the coral reefs and seagrass beds. There I eat sponges and sea grasses, especially turtle grass. People kill many animals like me for our meat and shells. People and dogs eat our eggs, which are laid on beaches. We are in danger of disappearing from the face of the Earth.</p> <p style="text-align: center;">I am a GREEN SEA TURTLE.</p>
<p style="text-align: center;">7.</p> <p>I am a "jointed-leg" animal, with a hard outer shell for a skeleton. I have ten limbs. Two of my limbs are much larger than the others. They have claws which I use to catch and crush my food. I eat small fish, pieces of sea animals, and other things I find on the sea bottom. I especially like eating sea urchins and snails.</p> <p style="text-align: center;">I am a CORAL CRAB.</p>	<p style="text-align: center;">8.</p> <p>I have a backbone, scales, and fins. I am bright red, with big, round eyes. I have very sharp spines on my top fin. I hide under corals. I swim through the water and eat shrimp and small fish. I have to be careful though, because Groupers and Eels eat me.</p> <p style="text-align: center;">I am a SQUIRREL FISH or POPEYE ANTI.</p>
<p style="text-align: center;">9.</p> <p>I am one individual in a colony of animals just like me. I have tentacles with stingers. I deposit a stony skeleton below me. I catch small drifting animals called "zooplankton." Colonies of animals like me make up a coral reef. Parrotfish and Four-eye Butterfly Fish eat me.</p> <p style="text-align: center;">I am a CORAL POLYP.</p>	<p style="text-align: center;">10.</p> <p>I live in a beautiful, spiraling shell. I move along the sea bottom and eat algae. I lay my eggs in the sand. Spiny lobsters eat me when I am small. When I am bigger, people catch me for food. I am a type of snail. In the past, there were many like me in the Caribbean. Now we have become harder to find.</p> <p style="text-align: center;">I am a "LAMBI" or QUEEN CONCH.</p>
<p style="text-align: center;">11.</p> <p>I have a radial, circular-type body form. I drift freely through the water, though you may find me washed up on the beach. I feed on small animals called zooplankton. I am almost clear and colorless. Jellyfish eat me.</p> <p style="text-align: center;">I am called a SEA WALNUT</p>	<p style="text-align: center;">12.</p> <p>My soft backbone and skeleton are made of cartilage. I look like a fish, but I am not a true fish. I have a good sense of smell, and two whisker-like "barbels" near my mouth. The barbels help me find food. I eat clams, crabs, and lobsters. I sleep in coral reef caves. Many people are afraid of me, but I am seldom dangerous to them.</p> <p style="text-align: center;">I am a NURSE SHARK.</p>

<p style="text-align: center;">13.</p> <p>I am a spiny-skinned animal, with a star-shaped body. I have five long, thin arms. I move on many tiny feet on the bottom of my arms. If I lose an arm, I can grow one in its place! I eat algae and bits of dead plants and animals on the reef. I hide from daylight in dark cracks and crevices of the reef.</p> <p style="text-align: center;">I am a BRITTLE STARFISH</p>	<p style="text-align: center;">14.</p> <p>I don't eat food because I make my own food using energy from the sun. I grow on the sandy bottom between the reef and land. I am a plant. I have long, thin leaves. Many young fish, shellfish, and other animals find shelter among my leaves. Turtles eat me.</p> <p style="text-align: center;">I am TURTLE GRASS.</p>
<p style="text-align: center;">15.</p> <p>I have a backbone, fins, and scales. I have a long, smooth body, and very sharp teeth. I swim very fast. I eat many small fish such as four-eyed butterflyfish, and parrotfish. Few other animals bother me, but humans sometimes catch me.</p> <p style="text-align: center;">I am a BARRACUDA.</p>	<p style="text-align: center;">16.</p> <p>I have a tube-shaped body with tentacles. I usually grow attached to a solid surface, such as rocks or seashells. My tentacles catch small fish. Sometimes I grow on seashells in which crabs are living. I steal bits of food from the crab, and protect it from octopuses and other crabs. I am eaten by starfish and sea slugs.</p> <p style="text-align: center;">I am a SEA ANENOME.</p>
<p style="text-align: center;">17.</p> <p>I have a soft body, with ten long arms. These arms help me swim freely and quickly—to people it looks as if I am swimming backwards. Two of my arms are long tentacles which catch my food—small fish. I can change color quickly. Sharks and people eat me. I am very fast.</p> <p style="text-align: center;">I am a SQUID or a CUTTLEFISH.</p>	<p style="text-align: center;">18.</p> <p>I belong to a group of unrelated animals that come in many shapes. The only thing we have in common is that we are very tiny. You could see me only through a magnifying glass or a microscope. Some of my group grow up to be larger animals. Some stay tiny. Probably trillions of animals like me drift through a reef's waters. Some of my group eat tiny algae plants. Others eat members of our own group!</p> <p style="text-align: center;">I am a ZOOPLANKTON.</p>
<p style="text-align: center;">19.</p> <p>I have a backbone, fins, and scales. I am round-shaped almost like a coin. I eat zooplankton (during parts of my life), the soft polyps of corals, and various worms. I have two big spots near my tail. It fools bigger fish—such as barracudas—that try to eat me.</p> <p style="text-align: center;">I am a FOUREYE BUTTERFLYFISH.</p>	<p style="text-align: center;">20.</p> <p>I am a jointed-leg animal, with a hard, outside skeleton. I have ten legs. After I lay my eggs, I carry them under my curled-under tail. I have two large antennae which I use to defend myself. I eat snails, worms, and crabs. Groupers eat me. People catch and eat so many like me that not many of us are left.</p> <p style="text-align: center;">I am a SPINY LOBSTER.</p>
<p style="text-align: center;">21.</p> <p>I am a spiny-skinned animal, with a circular body shape. I eat algae growing along the reef and ocean floor. I have long spines to protect myself. Turbot, or queen triggerfish eat me.</p> <p style="text-align: center;">I am a LONG-SPINED SEA URCHIN or SEA EGG.</p>	<p style="text-align: center;">22.</p> <p>I have a backbone, fins, and scales. My funny mouth looks like the beak of a bird. I am brightly colored. I am one of the largest reef fish, but I also eat algae growing on dead coral and inside coral polyps. Barracudas eat me.</p> <p style="text-align: center;">I am a PARROTFISH.</p>
<p style="text-align: center;">23.</p> <p>I have a backbone and fins. I am quite big. I am not a shark or a fish, however. My body is warm, like yours. I breathe air. I come in from the open sea to visit the edge of the reef. I often travel in schools, or groups. I eat tuna, sardines, and other fish that swim in schools.</p> <p style="text-align: center;">I am a DOLPHIN or PORPOISE.</p>	<p style="text-align: center;">24.</p> <p>I have a backbone, fins, and scales. I have a soft skeleton, like my relative, the shark. I have a barb on my tail. It has a nasty sting. My body is very flat, and I spend most of my time lying partly buried on the sandy bottom. I eat snails, crabs, and clams.</p> <p style="text-align: center;">I am a RAY.</p>

<p>25. I have a backbone, fins, and scales. I have a big mouth, and am marked with spots and stripes. I can swim, but usually I keep still and try not to be seen. I am eaten by sharks, and caught by fishermen. I eat small fish like Squirrel fish.</p> <p>I am a GROUPER.</p>	<p>26, I have a backbone, am an air-breather, and live on land. I eat groupers, turtles, squid, parrotfish, conch, and many other animals. I often catch so many animals on the reef that they have a hard time surviving. Sometimes, things that I do on land hurt animals and plants of the reef. I use coral to decorate my body.</p> <p>I am a HUMAN BEING.</p>
<p>27. I have a backbone, gills, fins, and tiny scales. I am well-known for my large, fierce jaws. I am long and snake-like. I eat octopuses, squirrel fishes, and sometimes eat chunks off careless SCUBA divers.</p> <p>I am a MORAY EEL.</p>	<p>28. I am a plant. Some plants in my group are so small that they drift in the water without being seen. Others grow large, leafy or grass-like. Some plants in my group grow on stones or dead coral. I need only sunlight, water, and substances dissolved in the water to live. I am eaten by snails like the queen conch, parrotfish, and many baby fish and sea creatures.</p> <p>I am ALGAE. When I drift in the water, I am called PHYTOPLANKTON.</p>







Correlation to National Standards from McREL (<http://www.mcrel.org>) :

Life Sciences

5. Understands the structure and function of cells and organisms
6. Understands relationships among organisms and their physical environment