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Coral Reef Nature Notes

A coral reef is created by colonies of tiny, single celled animals which produce a calcium carbonate exoskeleton and live symbiotically with photosynthetic algae. The algae provides corals with food and oxygen, and the corals provide nutrients and shelter in exchange.

This symbiotic relationship is the basis for great productivity in the clear shallows of nutrient poor tropical waters. The corals build upon each other to create a habitat for an amazing variety of creatures which rivals rainforests in species richness and diversity. You can see a few of these creatures on CES's Coral Reef Coloring Sheet.

Objective: learn about some common coral reef creatures.

Ages: Primary, Intermediate and Advanced

Materials: Additional teachers guide, *Exploring Coral Reefs* available from CES.

Subject: Science

Staghorn coral (*Acropora sp.*) - *Acropora* colonies form flattened plate like structures which may grow to be a meter in diameter in just seven years. This is one of the fastest growing types of coral and is thus often dominant on newly forming reefs. The wide plates cast shadows onto slower growing species and the algae living with the slow growing coral does not get the sunlight it needs to photosynthesize. But slower growing corals are not defenseless! When this happens, the slow growing coral will often send out long, tubular appendages which attack and eat away at the staghorn coral.

Jellyfish (*Crambion mastigophora*) - This species of jelly is from the Micronesian oceans. Jellyfish or jellies are really not fish at all, in fact, they are close relatives to corals - they are both in the phylum Cnidaria. Some, including this one, have long stinging tentacles which are used to capture prey. Jellyfish are most likely to be found in the outer area of the reef or in the open sea, floating near the surface. In Palau, Micronesia, there are some jellies living in salt lakes which have commensal algae just like coral and have lost their stinging tentacles.

Green turtle (*Chelonia mydas*) - These gentle creatures have life spans of up to 100 years, can grow to be 4 feet long and weigh up to 320 pounds. Green turtles are the most common sea turtle and can be seen from the Caribbean to the South Pacific. Little is known about where sea turtles go and how they navigate across the oceans, but it seems that females return to the beach where they were born to lay eggs. One of the best places on earth to see the green sea turtle is off of Sipidan Island in Malaysian Borneo where they rest in small crevices in the reef and swim lazily in the open water. Sea turtles of all kinds are in danger because their eggs are considered to be a delicacy. Luckily, there are also many people who care about the sea turtles and have set up sanctuaries and egg hatching centers to protect them.

Surgeonfish (*Acanthurus lineatus*) - Surgeonfish feed on algae growing on the reef. Many surgeonfish, including this species, maintain their own personal algal gardens and will guard their area fiercely, chasing off other fish and even scuba divers. Surgeonfish get their name from the scalpel sharp defensive spines at the base of their tail.

Copperband butterfly fish (*Chelmon rostratus*) - Butterfly fish are among the most brightly colored and beautiful fish on the reef. Most species occur in pairs and are territorial. Many feed exclusively on live corals. This particular species may be found on Australia's great barrier reef.

Sea fan (*Gorgonia sp.*) - The gorgonians or horny corals are related to the stony reef building corals but have a flexible skeleton of **keratin**. There are hundreds of different species of gorgonians many of which have a plant like appearance. The sea fan is just one form of horny coral. It's branches join together to form a lattice. Sea fans usually grow at a right angle to the water current which helps them to catch as much food as possible.

Brittle star (*Ophiothrix sp.*) - Brittle stars are related to the more widely known sea stars (both are in the phylum Echinodermata) and can be found around the world in coral reefs, kelp forests, and on sandy bottoms. Unlike sea stars, they can move their arms very quickly - as fast as you can move your fingers. They get their name from their ability to easily lose an arm which they will do if they are being threatened.

Moray eel (*Gymnothorax sp.*) - Although they have the long sleek body of a snake, morays are actually fish which have evolved to fit snugly into a crevice where they are most likely to be found, peeking out and waiting for a meal. Morays have an undeserved reputation for ferocity. They may bite if provoked, but are otherwise docile.

Emperor angelfish (*Pomacanthus imperator*) - Angelfish are closely related to butterfly fish but tend to be larger and are often even more colorful. Some angelfish feed on sponges which are protected by calcareous spicules and toxins. Eating a sponge would be something like having a meal of poisonous glass!

Sea anemone (*Stachodactyla sp.*) - Sea anemones are also relatives of corals - they are both in the phylum Cnidaria and the class Anthozoa. The difference is that an anemone is a single individual, not a colony of smaller individuals. Most of them are only a few inches across but some can grow to be more than a meter in diameter! Anemones are found all over the world in both tropical and cold northern waters. They are often brightly colored and may be white, green, blue, orange, red, or a combination of colors. Any fish or other smaller animal that happens to brush against their sticky, stinging tentacles is an easily captured meal.

Anemonefish or clown fish (*Amphiprion spp.*) - These fish are able to live among the stinging tentacles of the sea anemone because of a special chemical in their external mucus which prevents the anemones stinging cells from discharging. The relationship is a **mutualistic** one - the anemone fish chase off tentacle nippers and keep their host well groomed and are in turn protected from predators by the anemones stinging abilities. You will often find several anemonefish living in a single anemone - a large, dominant female, a smaller male and several juveniles. If the female is removed, the male will change his sex to take her place!

Violet spotted reef lobster (*Enoplometopus debelius*) - Lobsters are in the phylum Arthropoda which means they are relatives to insects and spiders. What is unusual about lobsters (and their cousins the crabs and shrimp) is that they have two pairs of antennae and five pairs of legs. Lobsters usually live in holes and crevices of rocky and coralline bottoms. Various species of lobster may be found all over the world and some are considered to be quite delicious. This particular species is rather small (about 6 cm.), brightly colored, and in a dangerous position (on the coloring sheet) - do you know why?

References:

Coral Reefs, Nature's Richest Realm. Roger Steene. Crescent Books, Avenel, NJ. 1990.

Here is a partial classification listing for the kingdom Animalia so you can see how these coral reef creatures are related:

Kingdom: Animalia
 Phylum: Cnidaria
 Class: Scyphozoa (jellyfish or jellies)
 Class: Anthozoa (corals, sea anemones)
 Order: Gorgonacea (horny or gorgonian corals such as the sea fan)
 Order: Actiniaria (sea anemones)
 Order: Scleractinia or Madreporaria (colonial stony reef building corals)
 Phylum: Arthropoda
 Class: Crustacea (lobsters, crabs, crayfish)
 Class: Insecta (insects)
 Class: Arachnida (spiders, mites, ticks, scorpions)
 Phylum: Echinodermata (sea stars, brittlestars)
 Phylum: Chordata
 Subphylum: Vertebrata
 Class: Osteichthyes (bony fish)
 Class: Reptilia (turtles, snakes, lizards, crocodiles)
 Class: Mammalia (humans, dolphins...)