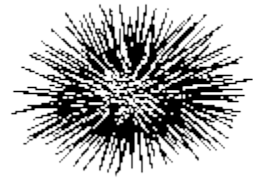


## *Tide Pool Organisms*



*Sea Urchin*



The sea urchin is a slow moving animal with an obvious appearance. It is covered with hundreds of sharp spines that serve as an adaptation to discourage many potential predators. As an herbivore, the sea urchin has adapted to rocky tidepools by developing five very sharp, hard teeth to scrape minute algae plants off the rocks. It also uses its hard teeth to grind away the rocks and burrow a home in the rock. It uses the burrowed home along with its long suction tube feet and spines to protect itself when the waves come.

*Sea Star*

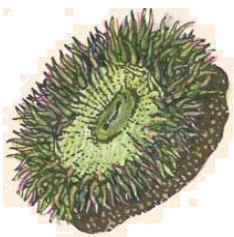


Sea stars are often found in the harshest intertidal environment: among the rocks, ocean currents, pounding waves and tidal surge. They have hundreds of tiny suction tube feet on the under side of each arm to help them adapt by holding on to the rocks against these great forces. These forces are so great, and a sea star will cling so tightly that one or more arms may be torn from its body. Sea stars can regenerate new arms and body parts when they are lost in an accident. Most sea stars are carnivores and are very slow moving. They have adapted by feeding on slow moving shellfish by opening the shells with their strong suction cup feet and inserting their stomachs between the shells to digest the animal.



*Sea Anemone*

The sea anemone adapts to its tidepool environment by disguising itself as a harmless flower or plant, similar in color and appearance to other marine plants. Actually the sea anemone is a predatory, carnivorous animal. The sea anemone is not a very mobile animal which is a problem for a predatory animal. The sea anemone adapts by developing an attractive crown of tentacles with microscopic barbs that can inject a passing fish or shrimp with a paralyzing toxin. It then uses its tentacles to drag its paralyzed prey into its mouth without moving from its position. The constant surging tides, crashing waves, sun and wind create a harsh environment for tidepool creatures. The sea anemone adapts by opening its tentacles when it is covered with water and closing its tentacles and sucking small pieces of seashells to its outside tissue to protect it from dehydration and desiccation when the eater empties from the tidepool.



*Sea Hare*

The sea hare is actually a large snail that has a very thin shell under its skin. It is a very fragile creature that has adapted to the tidepools by moving slowly and with subtle camouflage coloring that resembles a tidepool rock. Because the sea hare has slow and fragile characteristics, it has adapted to its environment by



developing a defense mechanism similar to an octopus. It can excrete purple ink that may confuse, paralyze or be offensive to a predator. As this camouflaged herbivore slowly grazes the rocks for algae, it can shrivel up its small flexible body and tuck itself into small rocky crevices for protection when the tide recedes or the waves are pounding.

*Octopus*



Octopi are carnivores and they eat a variety of crabs, shellfish and small swimming fish. Octopi are not strong swimmers so it is difficult for them to catch fast moving fish. They have adapted to this physical limitation by developing a mouth with a sharp beak, similar to the beak of a parrot. This beak allows them to bore a hole into the hard shells of slower moving animals. Another adaptation is their exceptional camouflage capabilities for hunting prey and evading predators. They can change their shape and color patterns within seconds to match the surrounding environment. They can also emit clouds of black ink to confuse and dull the senses of predators.

*Mussel*

Mussels connect themselves to a rock or other substrate and cannot move or hunt for food. They are bivalve filter feeders of microscopic plankton and other microorganisms that are suspended in the seawater. In order to protect themselves from hungry predators, mussels in large groups called “mussel beds” and during low tide close their shells tightly with water inside to protect their soft bodies from drying out.



*Chiton*



Perhaps the most mispronounced animal in the ocean is the chiton. It is pronounced with a hard “k” sound. Chitons are a type of mollusk that are identified by eight shell plates held together by an outside oval of tissue called a girdle. Most chitons are light sensitive so they’ll be found under rocks. Some species are brightly colored while others are well camouflaged. Chitons are found almost everywhere in the ocean – from the high intertidal zone to as deep as 4000 meters. The *Mossy Chiton* is covered in stiff hairs making it look fuzzy. They may be found on the topsides of rocks during low tide, especially if it is overcast. At night, they feed on red or green algae.

*Hermit Crab*

Hermit crabs are different than most crabs because they have a soft body and no shell of their own. They live in abandoned black turban and striped dog winkle shells which is why shells should not be collected anywhere along California’s coastline. They adapt to this physical disadvantage by using the abandoned shells of sea snails to protect their soft bodies from predators and the harsh tidepool environment. As scavengers, they will feed on bits and pieces of other creatures and plants including any of their own kind that are too slow getting into a new snail shell.

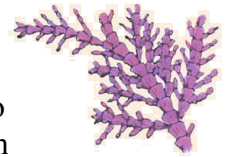


### *Tide Pool Sculpin*



Unlike many fish, the tidepool sculpin can stop swimming and rest on the rocky, sandy bottom. When they are disturbed, however, they quickly dart away. They are tiny 3-5" fishes who are well camouflaged and can change their mottled coloring to match the background. Other interesting characteristics of this species is their uncanny ability to find their way back to their favorite tide pool as well as the fact they have no scales. Tide pool sculpin survive by eating isopods, amphipods, shrimp and worms.

### *Coralline Algae*



This small low growing marine plant lives close to the wet rocks which helps it adapt to rocky tidepool environment. The plant cells of this algae secrete a hard covering, resemble coral, that helps protect it from pounding waves, burning sun and desiccation. Other plants that populate the tidepool include eelgrass, sea palms, feather boa kelp, winged kelp and giant perennial kelp.

### *Limpet*



Most limpets have hard conical shells that help them to adapt to the rocky intertidal environment. They clamp themselves so tightly to large, stationary rocks that it is very difficult to pry them loose without breaking their shell and killing them. By clamping down during low tide, they are able to prevent dehydration and desiccation and can live for several days without water. These herbivores graze on the large rocks for algae.

### *Shore Crab*



These green to red or purple crabs with black stripes are active during daylight hours. They are so well adapted to living out of water that they spend at least half of the time that way. They have excellent eyesight which adapts well to both day and night. For the most part, these crabs feed on land on diatoms and algae. Occasionally they will prey on hermit crabs and Black Turban snails, and they've even been observed capturing kelp flies with their very dexterous claws.

### *Turban snail*

The Black Turban snail is found in the upper intertidal zone. In size, its shell is about 1 to 1¼ inches or 3 centimeters diameter. Black Turbans eat a variety of algae, especially the microscopic film that grows on the surface of rocks. If you examine the snail's shell closely, you might find a small Black Limpet living on it. Tiny algae live on the Black Turban's shell that these Black Limpets eat. During low tide, Black Turbans will often group



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together and during this time the Black Limpets will move from shell to shell. Blue-banded Hermit Crabs love to live in the abandoned Black Turban shells

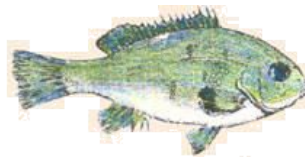
### *Barnacles*

Adult barnacles look very different from their crustacean relatives. After birth, barnacle larvae look just like larvae of other crustaceans; however, when a barnacle metamorphoses, it attaches it self to a hard surface head first and creates a cone around its body made of calcium.

Its modified legs, called cirri, filter water for plankton and detritus like little nets. These organisms are the highest living intertidal marine species. Most species can easily spend half of their lives out of water. Some species only need to be wetted with ocean spray making them well adapted for life along California's rocky, wave swept shoreline. Since these organisms are sessile, males may become female and vice versa in some species in order to reproduce.



*Pacific Goose Barnacles* are found in mussel beds only when the tide is the lowest. These barnacles look different from other barnacles because their cupped feeding appendages are on 3½-inch stalks.



### *Opaleye fingerlings*

When young, opaleye live in tidepools and can actually breathe air when the tidepool is exposed during a low tide. Adult opaleye eat algae, while juveniles are carnivorous, feeding on small invertebrates and jellies. Opaleye are dark olive green, usually with two white spots beneath the dorsal fin and blue eyes.

### Intertidal Zones

