Information on Common Animals in the Rocky Intertidal Zone

HERMIT CRAB (Phylum Arthropoda)
Feeding: Hermit crabs will eat just about anything; most are scavengers on dead organisms and detritus. Some species, however, also eat live food (small planktonic and benthic animals plus algae). Those that eat live food use arm-like feeding appendages (maxillipeds) to create a current and push water and food into their mouths.

Senses: Hermit crabs have good eyesight (they have compound eyes like insects). Setae (small hairs on their body) have tactile and chemoreceptive functions. They are very sensitive to vibrations and pressure changes in the water. Hermit crabs also use their antennae for chemoreception.

Defense: Hermit crabs are eaten by octopus, fish and other crabs (such as the lumpy claw crab in Penasco). They protect themselves by retreating into their shell. They also use the shell to protect themselves from desiccation. Some use their front chelipeds (claws) for defense as needed.

Locomotion: Adult hermit crabs use their front claws and middle legs to walk. Their front legs are also useful for climbing and turning themselves over. Their rear legs are reduced in size.

Other: Hermit crabs don't make the shells they occupy; they have to find empty snail shells. Certain species of hermit crabs have preferences for certain species of snail shells. For example, if they live in an area with lots of octopus, they might like long, narrow shells; while if they live in an area without octopus, they might prefer shells that are less heavy and awkward to carry around.

TIDE POOL SHRIMP (Phylum Arthropoda)
Feeding: Tide pool shrimp will eat just about anything; they are scavengers

Senses: Tide pool shrimp have good eyesight; they have compound eyes like insects. They use their long antennae and setae (hairs) on the arms and front legs have setae (hairs) for chemoreception and a sense of touch. The setae are sensitive to pressure changes in the water (eg, caused by another animal moving nearby).

Defense: Tidepool shrimp are eaten by fish and octopus. They are quick and agile and can dart away from many predators. Their transparent bodies make them relatively invisible to predators and help them to blend in with their backgrounds.

Locomotion: Tide pool shrimp swim; their back appendages have been modified into paddles called swimmerets. The two front appendages are not used for locomotion; they are primarily for catching food and cleaning themselves.

Respiration: Shrimp have gills, which must have a constant flow of water over them in order for gas exchange to occur.

Other: the species from Penasco is a "cleaner shrimp", that picks small organisms and pieces of dead skin off of other animals - such as your hand or legs in the water! The gray-brown blob near the head is the shrimp's main digestive gland. In females, you may see grey-colored granules in the abdomen; these are the eggs.

POLYCHAETE WORM (Phylum Annelida, Class Polychaeta)
Feeding: Most polychaetes have a well defined head and mouth parts. Feeding strategies vary with the family or species. They may be sediment/detritus feeders, opportunistic predators, tube-dwelling filter or deposit feeders, or parasites. Fireworms (*Eurythoe complanata*) from Puerto Penasco are both sediment/detritus feeders and predators.

Senses: Sensory structures can be found on a polychaete's head. They have an acute sense of touch and taste, and most have at least one pair of tiny eyes. More active polychaetes generally have the best-developed eyes.

Locomotion: Polychaetes have segmented bodies. Each segment has a pair of bristles, bearing paddle-like lobes called parapodia. They move by coordinating the movement of the body segments and the parapodia. Depending on the species, the parapodia can be used to crawl along the surface, to burrow, or to swim.

Respiration: Small polychaetes respire through their body surface. Larger species often have gills associated usually with the parapodia. Tube-dwelling polychates have their gills concentrated near the front of their bodies.

Defense: Fish, crabs, and other carnivorous invertebrates will feel on polychaetes. Many polychaetes have sharp bristles that can easily break off and become embedded in a predator (ie, fire worms have glass-like bristles). Polychaetes also produce a sticky mucus when tormented to deter predators. Tube-dwelling polychaetes ("tube worms") build tubes out of calcium carbonate, sand, or parchment. They can retreat into their tubes when threatened.

Other: Polychaetes are a very diverse class. They are almost exclusively marine, and inhabit almost all ocean habitats from mud and sand flats, to rocky shores, to the open ocean and deep sea.

BRITTLE STAR (Phylum Echinodermata, Class Ophiuroidea)
Feeding: Brittle stars are omnivourous. Depending on the species, they can feed by either waving their arms in the water and catching plankton with a mucus net that they produce, or by scavenging on dead material, or by preying on other benthic invertebrates. Food is transferred along the arms to the mouth using tube feet. The mouth is on the central disk, directed to the substrate.

Senses: Brittle stars have light/dark sensory organs all over their bodies. They have acute chemoreception on their body surfaces and tube feet.

Defense: Brittle stars are eaten by fish and crabs. They are very mobile and escape by hiding under rocks; others burrow in sand or mud or take refuge within a sponge or other colonial invertebrate. They can drop their arms (autotomize) easily (hense their name), perhaps luring a predator to go for an arm rather than their bodies. The lost arms can be regenerated as long as some of the central disk is still present.

Locomotion: Brittle stars use their arms to crawl. Some also use their tube feet and spines.

Respiration: Brittle stars have ten slits in their body wall (called bursae) that circulate water for gas exchange.
Other: Tube feet (like suction cups) connect to internal canals making up the water vascular system which is unique to echinoderms. Some brittle stars carry masses of babies on their "backs" (disks), much as scorpions do. Brittle stars (all echinoderms) are exclusively marine.

SEA CUCUMBER (Phylum Echinodermata, Class Holothuroidea)
Feeding: Sea cucumbers tend to be either deposit feeders or suspension feeders.

The type we tend to use in Marine Discovery (sulfur-tip sea cucumbers) are mostly suspension feeders. They suspension feed by extending their mucus-covered buccal podia (mouth tentacles) to catch plankton and detritus then retracting them to gather the food into their mouths. Sea cucumbers also can absorb dissolved nutrients directly from the water.

Senses: Sea cucumbers have light/dark reception all over their bodies. They also rely on touch.

Locomotion: Sea cucumbers use their tube feet and body wall muscles to move.

Respiration: Sea cucumbers have internal organs called respiratory trees which aid in gas exchange.

Defense: Sea cucumbers are eaten by fish, crabs and humans. However, most possess toxins in their skin which make them unpleasant to eat. Some species will even eviscerate (spit out internal organs) when disturbed. They can regenerate their internal organs, at great cost. The eviscerated guts of the sea cucumber provide a snack for predators and allow it to retreat to safety. Sea cucumbers are usually cryptic, living in burrows in sand, in crevices, or underneath rocks.

Other: Sea cucumbers use tube feet use for attachment to the substrate. The "spines" of sea cucumbers are reduced into fleshy bumps over the body surface.

SEA URCHIN (Phylum Echinodermata, Class Echinoidea)
Feeding: Sea urchins are generally omnivorous scavengers; some eat mostly algae. The mouth is located on the aboral surface,facing the substrate. There are 5 "teeth" (calcareous plates) around the mouth, called the Aristotle's lantern. The urchin opens and closes the plates to scrape food which is then transferred to its mouth using tube feet.

Senses: Sea urchins have acute chemoreception on their tube feet and body surface. They are also sensitive to touch and can sense light/dark.

Locomotion: Sea urchins use their tube feet and spines to move. Each spine fits into the test (shell) like a ball and socket arrangement at the base of the spine. They can move the spines in any direction.

Respiration: Sea urchins respire mostly through their tube feet. They also have 5 pairs of gills arranged in 10 rows of membranous, bushy projections around the mouth.

Defense: Sea urchins are eaten by marine and terrestrial mammals (including humans), as well as other invertebrates and fish. Spines are their main defense. Some spines have venom. Tube feet allow urchins to stick to a surface; it can be very difficult to remove them.

Other: Some species of sea urchins have small jaw-like pincer structures called pedicellariae on their tests. They can be used to catch small animals and as a deterrent against some larger animals. Some pedicellariae contain venom. Generally, though, the pedicellariae are used to keep the test clean and free of debris or parasites.

SNAIL (Phylum Mollusca, Class Gastropoda)
Feeding: Snails have a file-like "tongue" called a radula. Herbivorous snails use the radula to scrape algae and bacteria off hard surfaces. Predatory snails use the radula to drill holes through other snails or

clams. Other species of predatory snails use their muscular foot to pry open their prey. Once they've gained access, they then extend a proboscis (a fleshy tube at the front of their head) to feed.

Senses: Snails have eyes at the base of the two tentacles which also have chemoreceptive and tactile sensory functions. The foot provides a sense of touch.

Locomotion: Snails use their muscular foot for locomotion. They produce mucous ("slime") to help them glide.

Respiration: Snails use a siphon (a slender tube extending in front) to bring water into the gills.

Defense: The soft body of the snail is curled up inside the shell. Snails produce an operculum (a calcareous plate that functions like a "trap door") to close itself within its shell. The operculum and shell serve as protection against predators (birds, fishes, and marine mammals) and to resist desiccation (drying out) when the tide is out.

Moon Snail
"Moon snails do indeed drill holes in, and eat, other snails. These carnivores live beneath the sand, plowing along in search of other shelled animals to eat. When the moon snail finds a meal, it secretes a chemical substance onto the prey's shell to weaken it. The predator drills a hole into the thinned shell with its long, tooth-bearing tongue and devours everything inside". http://www.susanscott.net/Oceanwatch2002/mar15-02.html.

MUSSEL (Phylum Mollusca, Class Bivalvia)
Feeding and Respiration: Mussels use gills for feeding and respiration. The gills are made of jointed filaments covered with cilia and mucous. The cilia create a current which draws in oxygenated water and food particles. Food gets trapped in the cilia/mucous and is transferred to the stomach. Mussels are filter feeders on plankton, algae, and detritus.

Senses: Most have tactile and chemoreceptive senses on the edge of the mantle (the fleshy part).

Locomotion: Juvenile mussels attach to a substrate and remain sessile for the rest of their lives. They attach to various substrates by proteinaceous strands called byssal threads. Adult and juvenile mussels cannot move far, but can reattach their byssal threads if they become detached or to "creep" along the surface.

Defense: Mussels are eaten by a variety of fish, mammals, birds, snails and sea stars. Their only defense is "clamming up" and being attached to a firm substrate via the byssal threads, making it hard to pull them off of a rock.

SEA ANEMONE (Phylum Cnidaria, Class Anthozoa)
Feeding/Defense: Many species of anemones and corals are hosts to single-celled symbiotic algae (zooxanthellae) that live in the host cells. The zooxanthellae photosynthesize within the anemone and leach out glucose into the tissues of their hosts, providing them with food. Many anemones and corals also are predatory suspension feeders, using stinging cells (nematocysts) on their tentacles to catch microscopic animal. Some lack zooxanthellae, especially those found in deeper waters or under ledges.

Anemones have a ring of tentacles surrounding the mouth. The tentacles have special stinging cells, called cnidocytes, which contain harpoon-like stinging structures called nematocysts. The anemone uses these stinging structures to capture and paralyze their prey. The tentacles then pass the food to the mouth. The stinging cells of anemones typically don't harm humans.

Senses: Anemones are sensitive to touch and have excellent chemoreception (especially on their tentacles).

Locomotion: Anemones are generally sessile as adults, and attach to rocks or burrow in the substrate, using their pedal discs. Some can move, however, by using mucous to glide on their pedal discs, or by releasing the disc and weakly "swimming" or floating in the current until they encounter another substrate.

HYDROID (Phylum Cnidaria, Class Hydrozoa)

Feeding/Defense: Marine hydroids are all colonial. They live attached to rocks, shells or algae and are often small and inconspicuous. They have stinging cells for defense and are often small and cryptically colored. The ostrich plume hydroid has comensal shrimp that live amidst its branches. They may be mutualistic – protecting the hydroid from predatory nudibranchs and getting protection from the stinging cells of their living "home". Sea slugs (nudibranchs) are the major predators on hydroids.

Hydroids are carnivores; they feed on small planktonic organisms, paralyzing them with their stinging cells (nematocycts). The feeding mechanism is like that described for anemones. Hydroids do not have symbiotic algae.

Hydroids include the Portuguese-man-of war which is not a jellyfish, but the medusa stage of a hydroid. Freshwater hydozoa are the *Hydra* used in laboratories and common in ponds.

Senses: Hydroids are sensitive to touch and have excellent chemoreception (especially on their tentacles).

Locomotion: Hydroids alternate between a polyp stage (that you see as a colony attached to a substrate) and a medusa stage that is planktonic. The medusa releases egg and sperm; the fertilized planula larve then finds a suitable place to settle and metamorphose into a polyp. Th epolyp then buds into a colony. The cannot move once they are attached to a rock or other substrate.

SONORAN GOBY (*Gobiosoma chiquita* Phylum Chordata, Subphylum Vertebrata, Class Pisces)

Feeding/Defense: The sonoran goby is endemic to the northern Gulf of California. It is common in tide pools. It feeds on small crustaceans, worms and other invertebrates. Its defense is to be very cryptically colored against the sand. It is also small and able to dart into crevices for protection. Octopus an d other fish are predators on gobies.

Senses: Skin receptors sense temperature changes and touch.. Eyes for vision (especially for contrast and movement and shallow water fish have better color vision than humans). Nares for sense of smell. Hearing through the inner ear or lateral line system. Mouth and lips have taste organs (some sharks have taste-bud like cells on their body surface too).

Locomotion: Hydroids alternate between a polyp stage (that you see as a colony attached to a substrate) and a medusa stage that is planktonic. The medusa releases egg and sperm; the fertilized planula larve then finds a suitable place to settle and metamorphose into a polyp. Th epolyp then buds into a colony. The cannot move once they are attached to a rock or other substrate.