

**STARFISH** aren't fish -- they are boneless creatures with spiny skins, called Echinoderms. Turn a starfish over to see the hundreds of suction cup "tube feet" that pull it along. The hole in the middle is a mouth, and sometimes you catch the pale-brown stomach ballooning out through the mouth to digest food outside the animal. Look also for a red eye spot at the tip of each arm. The eyespots detect only light and dark. Starfish eat mussels and snails.

**SEA URCHINS** are spiny-skinned invertebrates. Urchins chew seaweed with a complex "jaw" contraption called Aristotle's Lantern. This jaw is about the size of a grape, but all you can see of it are the five "teeth" in the Urchin's tiny mouth. Turn an Urchin upside-down in seawater and watch it right itself, to see the long tube-feet and spines in action. Pieces of urchins you might find high up on the shore were probably left by gulls, which drop Urchins on rocks to smash them open for food.

**CRABS** roam the middle and lower shores. Lift up rocks to find them at low tide. The orange ones (Rock Crabs) give a very painful pinch; the green ones (Green Crabs) give a slightly less painful pinch and seem more inclined to run than fight. Crabs are scavengers, the clean-up crew of the seashore. Count the legs -- there should be four pairs plus the claws, but crabs often lose legs and can regenerate them. To hold a crab safely put your thumb and forefinger on either side of the top shell. Tell the sex of a crab by looking underneath, where its little abdomen folds under and lies against the bottom shell: males have a narrow, tapering abdomen, while females have a broad abdomen which unfolds to carry the eggs. Also, keep an eye out for fast-moving periwinkle shells -- they may be home to a hermit crab. Their beautiful blue eyes on stalks are worth a close look.

**MUSSELS** live attached to rocks by strong threads, near the pointy end of the shell. Mussels strain small edibles out of the seawater, and the Blue Mussel is itself edible. Horse Mussels -- large, with a purple outer shell -- often contain small odd-shaped pearls. Are you as strong as a starfish? Try to pull apart the two shells of a live mussel, like the starfish does.

**PERIWINKLES** are plant-eating snails. Rough Periwinkles, on the upper shore, have tall pointy shells and brood their young inside the mother's shell -- the upper shore is too dry for a jelly mass of eggs. Smooth Periwinkles live lower on the shore and lay eggs in a jelly mass, while the large Common (edible) Periwinkles release egg capsules into the sea. Periwinkles walk many metres each tide cycle on their one fleshy "foot". Look for the brown or black operculum, attached to the foot. It seals the shell shut like a submarine hatch, when the tide is out. Periwinkles graze on seaweeds, big and microscopic. Watch for places where a narrow band either side of a crevice is cleared of seaweeds -- there may be periwinkles living in the crevice, and creeping out at high tide to graze.

**DOGWHELKS** are meat-eating snails. They are nearly white, with pointy shells and a distinctive notch in the bottom of the big shell opening. Dogwhelks eat mussels and barnacles by drilling holes in their shells with a rasp-like ribbon of teeth in their mouth. Then the dogwhelk injects a little poison and crawls around to rasp off bits of the prey animal's flesh. Keep an eye out for mussel or snail shells with perfect little round holes in them -- the calling card of the Dogwhelk.

**BARNACLES** are related to crabs -- they have jointed legs. Their cone-shaped shell is a permanent home. Inside, the soft barnacle stands on its head and waves its feathery feet out the door to catch tiny floating edibles. To watch this feeding action, find a portable barnacle rock and place it in the water. Try splashing some water to simulate the rising tide. The very young barnacles are free-floating creatures -- the sea disperses them. But did you ever wonder how immobile creatures like barnacles mate?

**AMPHIPODS** are the little many-legged animals you find thrashing under rocks, or hopping in piles of decaying seaweed. Watch them swim to see how they got the name "side-swimmers". Some people call them sand fleas, but they don't bite. Amphipods are an important food source for bigger animals. They are crustaceans, like crabs and shrimp.

info

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# The ROCKY SHORE

Nova Scotia's rocky seashores are wonderfully varied. Some are steep cliffs exposed to the pounding ocean waves -- like Cape Split. Others have a gentler slope, with a greater area of potential living space for seashore plants and animals. Some shores are solid bedrock, while others are "cobble beaches" of rounded stones which make rattling noises as the salt water washes over them. These sounds are made as rocks tumble against each other -- a precarious habitat for soft-bodied sea creatures.

You will find some living things on all rocky shores, but plants and animals thrive best on shores of large solid rocks or bedrock, with lots of crevices and tidepools for shelter.

The seashore habitat is created by the tides. Twice each day, tides cause the ocean's edge to advance and retreat. The best time to explore rocky shores is within one hour of low tide. The times of high and low tide become about one hour later each day.

As you walk toward the water's edge at low tide, both the abundance and diversity of seashore life increase. There are both many more creatures and more kinds of them, the closer you go to the sea. Ecologists divide the rocky shore into three bands or zones, according to height above low tide and also the most common creatures: the Upper Shore, the Middle Shore (or Rockweed Zone) and the Lower Shore (or Kelp Zone).



**THE UPPER SHORE** is under-water only a few hours each day. Conditions vary from hot summer days to freshwater rainfalls to winter ice. All the creatures here have some structure or behaviour to prevent themselves and their young from drying up. Search for them deep in crevices, under rocks or in tidepools.

**THE MIDDLE SHORE**

**(Rockweed Zone)** is covered by seawater about half the time. Plants and animals have more "water" time to feed and breed. Mobile animals travel about during high tide with lots of time to find shelter. Ropy brown rockweeds of several species drape the rocks at low tide, but during high water their air bladders let them float upright, providing lots of water circulation for the creatures underneath.

**THE LOWER SHORE (Kelp Zone)** is covered by seawater except at low tide.

Swaying brown kelp (*Laminaria*) may be just visible below the low tide line. Look for kelp in tidepools here, too. Among the kelp holdfasts lives a whole community of strange creatures, such as brittle stars and sea spiders. Red and green seaweeds add some bright colour to the shore and tidepools. In some places, a carpet of purple-red Irish Moss seaweed provides a habitat for small animals and other seaweeds, like the brittle pink *Corallina*. Watch for adaptations of shape and behaviour that help plants and animals hang on while pounded by crashing surf. You must choose the lowest of low tides to see this habitat well.

Did you visit a seashore and not see anything like this? Try again within an hour or two of low tide. Imagine that you are a water creature, drowning in the dry air and desperately seeking a cool, wet place to hide. "Dial-A-Tide", 426-5494, or check the yearly *Canadian Tides and Current Tables* or a local newspaper for high and low tide times predicted by Environment Canada and the Department of Fisheries and Oceans.

P.S. Rocks are creatures' homes. If you turn one over, please turn it back.



Rough Periwinkle



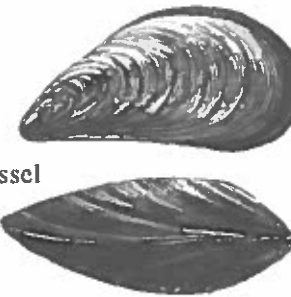
Barnacles



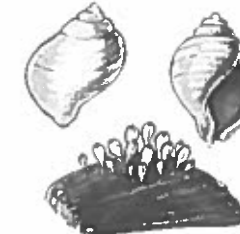
Green Crab



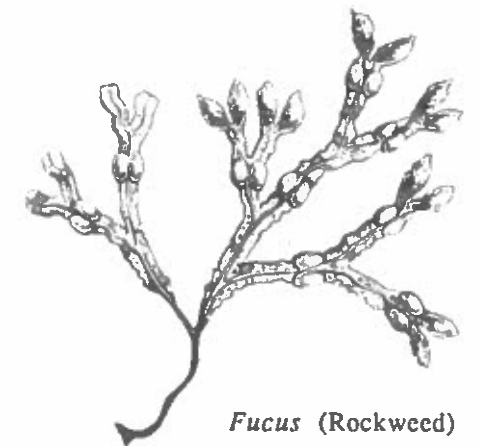
Smooth Periwinkle



Blue Mussel



Dogwhelks



Fucus (Rockweed)



Amphipod

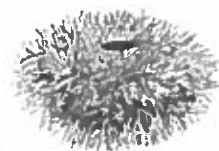


Starfish



Dogwhelk egg cases

Sea Urchins (alive)



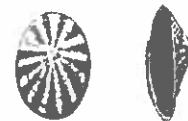
(dead)



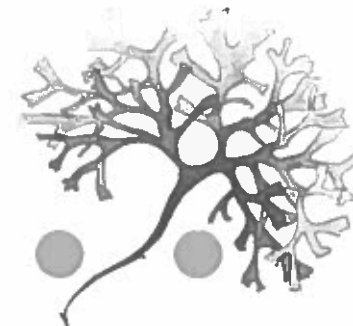
Brittle Star



Common Periwinkle



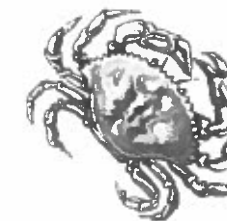
Limpet



Chondrus (Irish Moss)



Hermit Crab



Rock Crab



Sea slug



Laminaria (kelp)

Laminaria (Horsetail kelp)