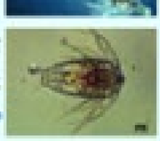
The search for FOOD

Filter Feeders or **Suspension Feeders** sieve seawater for nutrients and plankton. Plankton is a collective term for microscopic plants and animals suspended within the water and are transported by currents. Some examples of plankton include single-celled algae, small crustaceans and the larvae of many marine animals such as crabs, prawns, worms and fish. Barnacles, sponges and sea anemones are organisms that adopt this feeding mode.



▶ **Crab Zoeae** and **Megalopae** (top photo) and **Nauplius** (bottom photo) form part of the plankton found in the sea.

Deposit Feeders collect detritus such as decaying matter and fecal matter that settle on the seabed. Some deposit feeders include Sea Cucumbers and worms.

Herbivores such as Nerite Snails and Parrotfish feed on plants such as seagrasses and algae.

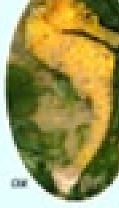
Carnivores such as the Drill and the Octopus prey on other animals.

Omnivores eat both plants and animals. Sea Slaters and the Ghost Crabs are omnivores.

Scavengers, such as most crabs and prawns, are important to the ecosystem as they feed on dead organisms.

Got to stay ALIVE!

Camouflage is a method used to appear "invisible" to both predator and prey. Animals exhibit 'passive camouflage' when their skin or shell blend in with the surroundings.



◀ The **Seahorse** (*Hippocampus kuda*) is a strange, bony fish. It is a master of camouflage and hides amongst seaweeds and seagrasses. Unlike most other fishes, seahorses swim vertically instead of horizontally. Female seahorses transfer eggs into brooding pouches of males. Upon receiving the eggs, the males fertilise and incubate them until they hatch. The males continue to care for the young until they are old enough to venture out on their own.

◀ Looking identical to a piece of rock or coral rubble, the **Stonefish** (*Synanceja horrida*) can be found lying motionless for hours on the seabed! Their venom, delivered via a hollow spine, may be fatal to some. These spines are used only as protection and not to obtain prey.

Active camouflage requires input from the part of the animal in order for them to blend in with their surroundings.

▲ The **Elbow Crab** (*Rhinolambrus pelagicus*) is an extremely well-camouflaged crab that moves slowly and ambushes any prey within striking distance.

▶ **Three-spined Toad Fishes** (family Batrachoididae) are often found hiding under rocks and between crevices during low tide. When aggravated, they "croak", hence the common name.

▲ Also known as 'Pink tips' due to the bright pincer tips, **Sponge Crabs** (*Lauridromia indica*) cut out a piece of sponge to wear! The sponge is held to their back by small pincers of their last two pairs of legs. These crabs prune the sponge constantly as the sponge continues to grow!

▶ The **Spotted-tailed Frog Fish** (*Antennarius trisignatus*) has a lure on its forehead that dangles to entice prey towards them. Once the prey is near enough, this fish, with a perfect camouflage, would very quickly gulp it!

◀ **Onch Slugs** (*Onchidium* spp.) are often missed as they match the colour of rocks! They do not have a shell. Instead these animals have thick, warty and waterproof skin as protection. They move very slowly, feeding on a layer of algae growing on rocks. These slugs, although closely related to marine snails, have developed pseudo-lungs instead of gills and breathe atmospheric air!

▶ The **Salmacis Sea Urchin** (*Salmacis* sp.) carries shells, seaweeds and other debris on its tube feet. Can you guess why it does so?

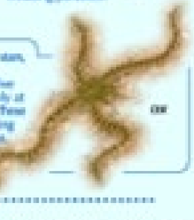
RELATIONSHIPS

Many relationships are forged within the natural environment in the bid to be ahead in life's race.

▶ **Mutualism** is when the interaction between two organisms is beneficial to both. This can be seen in a partnership between the **Anemone shrimp** (*Periclimenes brevicarpalis*) and the **Carpet Sea Anemones** (*Stichodactyla haddoni*). The shrimp lives within the tentacles of the sea anemone where it is protected from predators. In turn, the shrimp helps keep the body of the anemone clean by feeding on organic matter and parasites.

▶ **Commensalism** describes an interaction where an organism benefits and the other is unaffected. "Squatters" such as small shrimps and brittlestars may be found living inside sponges. Small shrimps and brittlestars are detrital feeders and forage outside the sponge. They cause the sponge no harm.

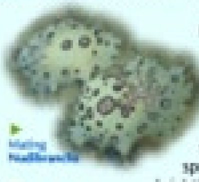
◀ **Parasitism** occurs when one party in the interaction benefits at the expense of another. The parasitic barnacle *Thompsonia* sp. affects many species of shore crabs. These barnacles take over the reproductive systems of the crabs, churning out their own young. The crabs are helpless against these invading parasites!



A close relative of the sea stars, **Brittle Stars** (Class Ophiuroidea) also have five arms that are attached only at the base to a central disc. These arms break off easily, giving them their common name.

The Art of MULTIPLYING

Most immobile or slow moving marine organisms undergo 'spawning', which involves their eggs and sperms being released into the water column. The eggs are fertilised in the water column, out of the body of the females. Organisms that practice this form of fertilisation include the sea stars, anemones, sea cucumbers and hard corals. Cues from the environment are used and the factors leading to the time of spawning is very precise. In fact, many species of corals on our shores release their eggs and sperms only for a few nights in April!



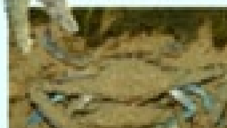
▶ Mating **Nudibranchs**

Many marine organisms are hermaphrodites, possessing both male and female organs. One such group of organism is the nudibranchs. Upon meeting another member of the same species, nudibranchs exchange sperms to fertilise their eggs. Their brightly coloured eggs are then laid in a whorl or spiral, on hard substrates such as rocks.

◀ Corals spawning

◀ When **Common Sea Stars** (*Archaster typicus*) are about to mate, the smaller male stacks on top of the female. Their sexual organs do not actually meet; this is called pseudomating. The eggs and sperms are released at the same time and fertilisation takes place externally.

Most crabs undergo internal reproduction, where eggs are fertilised within the females. Males usually wait until females moult, rendering their shell soft, before proceeding to fertilise the eggs. Males have been observed guarding females which are about to moult to ensure access to these females.



◀ Mating **Flower Crabs** (*Portunus pelagicus*)

PACKAGED BABIES

Many species of molluscs lay egg cases which contain the young animals. The egg cases are usually made of a tough and/or unpalatable material which discourages predators and scavengers.

▲ *Thais* sp.

Mature **Drill** eggs

▶ The **Drill** (*Thais* sp.) lays its eggs in yellow cases, each about the size of a rice grain. The egg cases are usually packed closely together. Each egg case may contain as many as a thousand eggs, most of which are unfertilised and serve as food for the developing embryos. When the egg cases are mature, they become purple and young Drills emerge. Drills are very common snails that feed on barnacles by 'drilling' a hole through the calcareous plates. They then suck the contents using their proboscis.

◀ The **Spiral Melongena** (*Pugilina cochlidium*) lays rows of egg capsules, each about 2 cm long. This snail feeds on barnacles. The shell is covered with tiny hairs that trap sediment and help camouflage the animal.

A **Moon Snail** laying eggs

◀ Sand collars are egg cases produced by **Moon Snails**. The collar is formed as a sheet of mucus secreted from under the foot of the snail and is moulded using the outside of the shell as a guide. The eggs are attached on the underside of the collar, which becomes completely impregnated with sand particles.