MOLLUSCS
SOFT BODIES, HARD SHELLS

SOFT-BODIED INVERTEBRATES

Molluscs, one of the largest groups in the animal kingdom, have soft bodies and generally have a hard shell for protection – so they are often called "shellfish". Most molluscs are found in the ocean, but many can be found in freshwater and on land.

Worldwide there are about 100,000 species of marine molluscs. Western Australian waters are home to over 2,000 species of mollusc – with nearly 10% of these found only along our coast.

Beach detective

Molluscs are common in rock pools and a large variety of empty mollusc shells are found washed up on beaches. It's fun to try and identify what animals these shells came from, but always be careful - even empty shells can provide homes for other marine animals like hermit crabs, octopus and small fish.

A miniature ram?

Small spiral structures that look like a ram's horn are very common along Western Australian beaches. These are the internal shells of Spirula spirula – a deep-sea relative of the cuttlefish.

Slippery little suckers

Look out for dark blobs of slime that wash up on the beach at certain times of the year. These are actually sea hares – which are gastropods, closely related to nudibranchs. When threatened, these slug-like animals can excrete toxic purple ink that can irritate the eyes and may even kill a dog if eaten.

Sea hares get their name from the their tentacles, which resemble hare's ears.

Living Fossils

Only a very lucky beachcomber will find a nautilus shell. The nautilus is the one cephalopod with a true external shell. The inside of the shell is lined with nacre (mother-of-pearl) and is divided into many gas-filled chambers that help the animal float. The spiralled, chambered nautilus shell is perfectly proportioned mathematically and presents one of the best natural examples of a logarithmic spiral – a special kind of spiral curve that often appears in nature.

Shaped like an ear

You may come across ear-shaped shells that are rough on the outside and smooth and shiny on the inside, with a row of small holes near the edge of the shell. These are from abalone, which are common to the rocky reefs around Perth. The hard, rough outer shell protects the animal from predators while the polished silvery-pearl inner shell protects their soft flesh from damage.

Guess the predator

You can often find chalky cuttlebone washed up onto the beach – these are the internal shells of cuttlefish. Some cuttlebones have teeth marks on them that may indicate what killed and ate them – the peg-like teeth of a dolphin, incisors and scraping marks of a sea lion, sharp teeth of a shark or large fish, or even the peck marks of birds.

Armour-plated

Meaning "bearer of plates", the Polyplacophora (or chiton) are adapted for life on rocky surfaces in the intertidal zone. They are oval in shape and have eight separate articulated plates (which look like armour) that overlap to form the shell. A tough, scaly tissue called the girdle surrounds the shell.

Clinging to rocks with a broad muscular foot, they roll up into a ball to protect themselves if dislodged. With no eyes or tentacles, these nocturnal vegetarians use their radula to scrape algae off the rocks at night.

Like an elephant's tusk

These marine molluscs are known as tooth or tusk shells as the shell is tusk-shaped, but unlike most molluscs the shell is open at both ends.

Scaphopod means "spade foot", referring to the muscular foot of the animal which anchors the larger end of the shell into sand.

Snails and slugs

Gastropods are the largest and most diverse class of molluscs, and include such animals as baler shells, cone shells, turban shells, cowrie shells, limpets, periwinkles and abalone – just to name a few.

Meaning "stomach foot", gastropods are sea snails – with a large muscular foot attached to a body that is coiled within a single spiralled shell. Most have gills and a well-developed head with eyes and tentacles. Vegetarian gastropods use their radula to scrape up algae, while the radula of carnivorous gastropods is adapted to bite or drill holes in the shells of prey.

All nudibranchs are carnivores.

Nudibranchs, or sea slugs, are gastropods with no shell. They are brightly coloured and patterned, which can provide camouflage and warn off predators – as they protect themselves by excreting a foul-tasting toxic chemical. Meaning "naked gills", most nudibranchs possess feathery appendages on the outside of their body that have replaced internal gills.

Terrestrial cousins: Gastropods conquered land by eliminating the gills and converting the mantle cavity into a lung.

Left high and dry

Intertidal gastropods are highly adapted for living in extreme conditions where they are exposed to the atmosphere or to strong waves and currents. They resist water loss at low tide by retreating into their shells and keeping them tightly sealed (such as whelks and turban shells) or by clamping their shells firmly to the rocks (like abalone and limpets). Gastropod shells range from being thick and ridged – which helps the animal survive the pounding waves, through to low and flat - a shape that offers less resistance to waves.

Smallest class of molluscs

Aplacophora are worm-like marine molluscs that mostly live in deep water. Meaning "bearer of no shells", the mantle does not produce a shell but is embedded with hard calcareous spicules (needle-like rods), possibly to deter predators. The foot is either much reduced or completely absent.

Smart, swift and secretive

Squid, octopus, cuttlefish and nautilus belong to the class of molluscs known as **cephalopods**, meaning "head foot" as the muscular foot common to molluscs has become suckered tentacles that appear to be joined to the head.

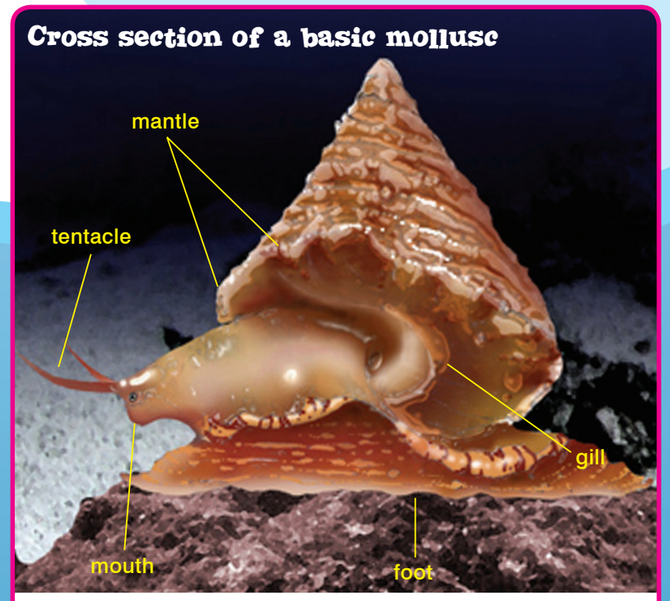
The basic mollusc shell is internal and highly modified, or in the case of octopus absent altogether. Cephalopods are the most intelligent of all invertebrates, with an advanced nervous system, a well-developed head and complex eyes.

Many cephalopods have mastered the art of camouflage: changing colour rapidly to blend in with their surroundings. With the exception of the nautilus, all cephalopods have a sac that can discharge a cloud of ink to confuse and escape from predators.

They are fast moving active hunters with a hard parrot-like beak used for biting, poisonous salivary glands that paralyse and kill their prey, and a radula that rasps their food to pieces.

The giant squid, which may grow to 20 m in length to the end of its tentacles, is the world's largest living invertebrate.

Cross section of a basic mollusc



Mollusc body plan

Although molluscs take many shapes and forms, they share the same basic body plan: a head, a single muscular "foot" on which they move about, and a mass of internal organs.

Most have hard shells (although these may be reduced, incorporated into the body or in some species absent altogether) and a mantle – a fleshy membrane that covers the body and secretes the shell. Most molluscs also have a rasping ribbon-like tongue, called a "radula", which is used to tear up food and draw it into the mouth.

There are seven different classes of molluscs: **Gastropoda** (snails and slugs); **Bivalvia** (clams, oysters, scallops and mussels); **Cephalopoda** (squid, cuttlefish and octopus); **Polyplacophora** (chitons); **Scaphopoda** (tooth or tusk shells); **Aplacophora** (worm-like molluscs) and **Monoplacophora** (deep water limpet-like species).

One shell or two?

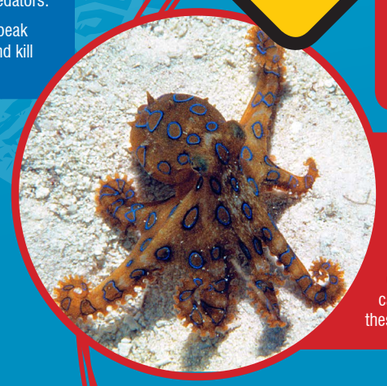
The name bivalve literally means "two shells": A shell with two halves, joined by a hinge, encloses the flattened body of these molluscs. Bivalves, the second largest class of molluscs, have no head and therefore no radula, so generally filter food particles from the water.

They tend to be sedentary, either attaching themselves to rocks or burrowing into sand. Some clams however can move about with their foot and scallops clap their shells together to produce a jet of water and can shoot backwards with speed.

DANGER ZONE

Beware of pretty shells!

Cone shells are very attractive but may also be very dangerous. The cone shell uses hollow barbed shafts, like harpoons, to inject venom and paralyse its prey. This venom can also cause paralysis and breathing problems in humans, and even death.



Where are those blue rings?

Normally well camouflaged, this small but extremely venomous octopus develops bright blue rings on its skin when threatened or disturbed. It kills its prey – small crabs and shellfish – with a toxin injected with their bite; which can cause breathing problems and paralysis in humans. So be very careful when handling dead shells, empty cans and bottles, as these are great places for this little critter to hide!

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