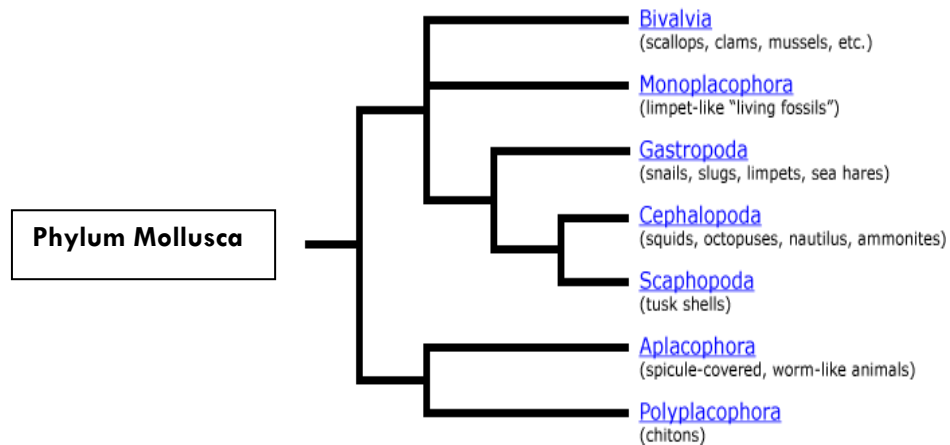


Classification of Phylum Mollusca

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Brusca and Brusca (2003) divided Mollusca into 7 classes



Class 1: Aplacophora (not bearing plates)

- Primitive bottom-dwelling marine molluscs with cylindrical and vermiform body.
- Poorly developed head, mantle and foot and without shell.
- Calcareous spicules in skin.
- Radula in some forms and heart bilocular.
- Excretory system without nephridia but includes podocytes and epidermal gland cells.
- Primitive ladder-like nervous system.
- They include Chaetodermomorpha and Neomeniomorpha.

Chaetodermomorpha (mud-mole)



Gilled, burrowing, deposit feeding and gonochoric forms.



Gill less, creeping, carnivores and hermaphroditic forms.

Neomeniomorpha (solenogaster)

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Example for Aplacophora: *Chaetoderma*

Vermiform marine mollusc covered with aragonite spicules in cuticle and lacks shell. They are small cylindrical burrowers that feed on detritus in the sediment of deep oceans. The mantle cavity is reduced to an opening at the rear end of the body, into which the animal discharges waste from the gut. One pair of Ctenidia lodged in the mantle cavity. Foot absent. Oral shield around mouth is the chemosensory organs. The common species include *Chaetoderma elegans* also known as glisten worm and *C. nitidulum*, the first species of aplacophoran mollusc to be described.

Class 2: Monoplacophora (bearing single plate)

- Very primitive benthic forms with a single cap like shell enclosing the flat and oval body.
- Head reduced without eyes and tentacles.
- Flat, broad, circular and ventral creeping foot.
- Simple and coiled alimentary canal with a radula.
- Tetralocular heart.
- Primitive ladder-like nervous system.
- Sexes are separate (dioecious).
- Serially arranged monopectinate gills and tubular nephridia (evidence of segmentation).
- They are living fossil and connecting link between annelids and molluscs.

Example for Monoplacophora: *Neopilina*

One-shelled marine mollusc. They are limpet-like creatures with a shell length of about 3 cm. It belongs to a group of molluscs only known as fossils (*Pilina*) from the Cambrian period so can be considered as living fossils. The shell tip points towards the head or coiled forward. Mantle cavity is absent. On either side of the foot there are five comb-gills (Ctenidia). Excretory systems are serially arranged nephridia like in annelids (segmental repetition). Sexes separate. Present name of the class is *Tryblidia*.



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They were believed extinct and only known as fossils until the discovery of *Neopilina galathea* in 1952.



Gumboot chiton (*Cryptochiton stelleri*) is the largest of the chitons, growing to 36 cm and over 2 kg

Class 3: Polyplacophora (bearing numerous plates)

- Primitive benthic forms with a shell of 8 movably articulated transverse plates enclosing flat and oval body.
- Head indistinct without eyes and tentacles.
- Flat, broad, muscular ventral foot for creeping and anchorage.
- Body covered by leathery mantle and lateral portion of mantle is called girdle.
- Numerous pairs of gills in pallial groove.
- Buccal cavity with radula.
- Tri-ocular heart and primitive ladder-like nervous system.
- Sexes are separate (dioecious).

Example for Polyplacophora: *Chiton*

Chitons are oval shaped marine molluscs inhabiting the intertidal zone of rocky sea shores or shallow waters. On the dorsal surface is a row of eight overlapping plates surrounded or covered by a tough girdle. They use a large, flat foot for creeping along and clinging to rocks. they also have a well-developed radula with which to scrape algae and other plant food from rocks. On either side

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of the foot is a pallial groove which contains the gills. Most are nocturnal in habit and are negatively phototrophic.

Class 4: Gastropoda (Stomach foot)

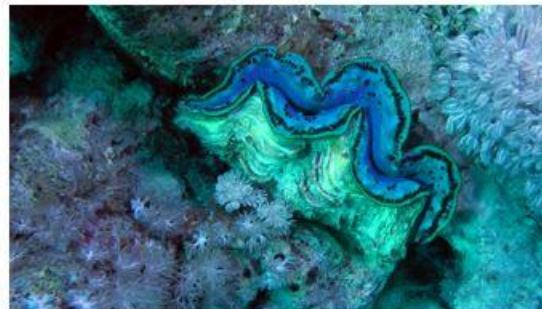
- Group of torted molluscs with asymmetrical body and spirally coiled conical univalved shell.
- This highly diverse group Includes marine, freshwater and terrestrial forms.
- Head distinct with eyes and sensory tentacles.
- Well-developed feet acting as a creeping sole.
- Buccal cavity contain radula.
- Respiration by ctenidia in aquatic forms and pulmonary sac in terrestrial forms.
- Trilocular myogenic heart and excretory organ are nephridia.
- Mostly dioecious and some are monoecious.

Example for Gastropoda: *Turbinella*

Sacred chank or divine conch is a marine species of very large sea snail with a gill and an operculum which occurs in Indian ocean. The old generic name was *Xancus*. It is usually pure white under a heavy brown periostracum. Shells of the normally right-handed (Dextral). Shell was considered to be sacred in Hinduism and Buddhism. Shell is sometimes modified by having the tip of the spire cut off, so it can be blown as a ceremonial trumpet. Very rare left-handed (Sinistral) shells are known as *Dakshinavarti Shankh* in Sanskrit.



Development is indirect with Trochophore and Veliger larvae



Giant clam (*Tridacna* sp.)
Largest living bivalve mollusc

Classification of Phylum Mollusca

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Class 5: Pelecypoda or Bivalva (Hatchet foot)

- Laterally compressed aquatic molluscs with paired mantle lobes and dorsally hinged bivalved shell.
- Posteriorly mantle lobes fuse to form inhalant and exhalent siphon.
- Cephalic region without eyes and tentacles, but with labial palps. Osphradia and statocysts present.
- Foot ventral, muscular, plough shaped adapted for burrowing. Byssus threads for attachment.
- Radula absent, they are suspension feeders.
- A pair of lamelliform (plate-like) gills present.
- Sexes separate. Include glochidium larva.

Example for Pelecypoda: *Perna*

Popularly known as sea mussel or *Mytilus*. It is an edible, sedentary marine mollusc which lives in large numbers in the intertidal zone of coastal waters, remaining attached to rocks (mussel beds). A distinct head is absent. The whole body is enclosed within a symmetrical bivalve shell. The downward-pointing beak, and the dark green colour that becomes brownish towards the umbo. Each valve is wedge shaped anteriorly pointed and posteriorly expanded. Foot is long, cylindrical and extensile. Byssus threads are seen for attachment. *Perna* is economically important as a source for protein and glycogen rich meat. Shell is used to produce lime, cement and carbide.



Some tribes use the tusk shells as bridal ornaments



Internal shell of a Cuttle fish is called as Cuttle bone made of Aragonite

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Class 6: Scaphopoda (Shovel foot)

- Marine bottom-dwelling burrowing molluscs with low level of body organization.
- They are long, slender, cylindrical, untorted without eyes, tentacles and gills.
- Head and foot are anterior. Head also called proboscis and extensile conical foot adapted for digging.
- Tubular mantle covered by univalve, tubular and terminally tapering shell open at both ends.
- Toothed radula seen in buccal cavity.
- Heart absent, a pair of nephridia seen.
- Protrusible thread like tentacular process in head: Captacula (Feeding appendage).
- Sexes separate. Include trochophore and veliger larva.

Example for Scaphopoda: *Dentalium*

Popularly known as “tusk shell”. They are burrowing, deep water marine mollusc which lives partially buried in sandy sea bottom. Slightly curved shell is open at both ends. Body inside shell has 3 parts: head, foot and visceral mass. Head and foot are protrusible and form anterior part of body. Head devoid of eyes but have a group of prehensile ciliated sensory cephalic filaments called captacula which are feeding organs and tactile organs with chemoreceptors. Gills are absent.

Class 7: Cephalopoda (Head foot)

- Exclusively marine, pelagic molluscs which are highly organised and are largest among the invertebrates.
- Distinct head with well-developed eyes and a crown of circum-oral arms around the mouth.
- Closed circulatory system with trilobular heart and a highly organised nervous system.
- Posterior part of foot modified into exhalant siphon. Actively moving predators of sea.
- Presence of ink gland as an escape mechanism.
- Well-developed oral cavity with radula and horny jaws.
- Sexes separate. Male have spadix (copulatory arm).

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Example for Cephalopoda: *Sepia*

Commonly known as Cuttlefish. Shell is internal (Cuttle bone). Body has two divisions- head and visceral hump. Distinct foot is absent. Head bears a terminal mouth, a pair of lateral eyes and 5 pairs of circum-oral arms with suckers. Male have a modified left arm called spadix. Trunk is covered by leathery mantle with frill like lateral folds or fins. Mantle cavity opens out ventrally through siphon. Skin of *Sepia* has a remarkable colour changing ability. They contain ink sac opening to its rectum for defense.

Nautilus (Living Fossils) CEPHALOPODA

They are the surviving members of Palaeozoic cephalopods. They are carnivorous, bottom dwelling marine cephalopods which are gregarious and nocturnal.

The body is enclosed by a spirally coiled multilocular shell. Body consists of head and visceral hump. Ink glands and Chromatophores are absent. Hood or muscular ridge overhead serves as operculum when animal retracts body into shell. Nautilus yields Osmena pearl.

Nudibranchs (Naked Gills) GASTROPODA

Nudibranchs are the group of soft-bodied, marine gastropod molluscs (Sea slugs) which shed their shells after their larval stage. These benthic organisms are most abundant in shallow, tropical waters. Their scientific name, *Nudibranchia*, means naked gills, which signifies the feathery gills that wear on their backs. Generally oblong in shape, they are ornately colored to match their surroundings which helps in camouflage, and some even retain the foul-tasting poisons of their prey and secrete them as a defense against predators. They are carnivores and identify prey with two highly sensitive tentacles, called rhinophores. They are simultaneous hermaphrodites. Nudibranchs that feed on hydrozooids can store their nematocysts in the dorsal body wall. These stolen nematocysts, is called as kleptocnidae.