

Phylum $\Rightarrow$ Mollusca (soft bodied)

(The soft bodied and shelled animals)

✓ Second largest animal phylum.

1. Habitat :- Predominantly marine, may occur even in fresh water or on land (terrestrial)
2. Level of org :- Organ system ✓
3. Symmetry :- Bilateral ✓
4. Germ layers :- Triploblastic ✓
5. Coelom :- Eucoelomate (schizo) ✓
6. Digestive system :- complete alimentary canal
 *** mouth contain file-like rasping organ for feed, called radula. It posses chitinous teeth. **
7. Circulatory system :- open type (closed in class cephalo-poda)
 Respiratory pigment blue in color 'Cu' containing Haemocyanin. **
8. Respiratory system :- The space b/w the hump and the mantle is called mantle cavity in which feather like gills or ctenidia are present. They have respiratory and excretory functions.
9. Excretory system :- By one or two pair of kidney
 (feather like gills) also called organ of Bojanus which opens into mantle cavity.
10. Nervous system :- few pairs of ganglia ✓
11. Reproductive system :- usually dioecious, (unisexual)
 Fertilization may be external or Internal
 Molluscs / Echi / Hem / larva + nt
 = oviparous with indirect development
 (larva + nt)

** Body is covered by calcareous shell and is unsegmented with a distinct head, muscular foot and dorsal visceral hump.

** Head is anterior and bear sensory tentacles

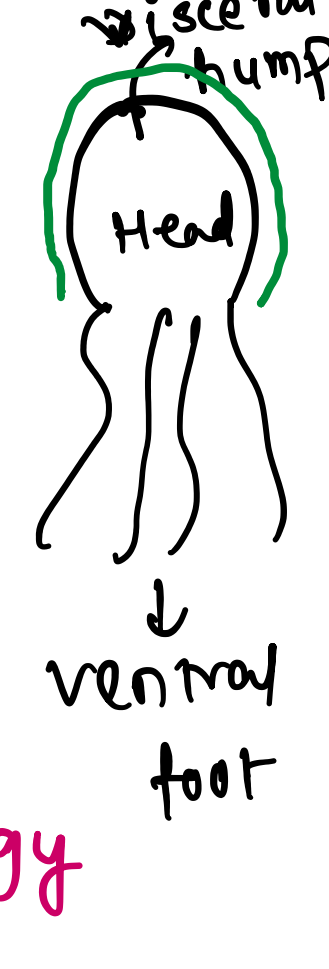
** A visceral hump is covered by soft and spongy layer of skin which forms mantle or pallidium. The space between hump and the mantle is called mantle cavity or pallial cavity.

** Mantle secrete calcareous shell, which may be external or internal.

✓ (shell is absent in octopus) $\rightarrow$ belongs to class Cephalopoda

Example: $\rightarrow$ ⑧

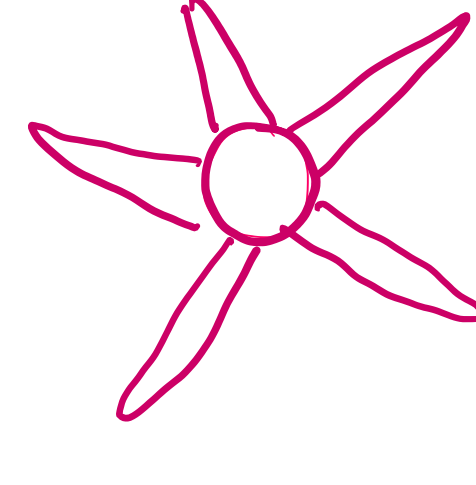
- ✓ P $\rightarrow$ Pila (Apple snail)
- ✓ D $\rightarrow$ Dentalium (Tusk shell)
- ✓ O $\rightarrow$ Octopus (Devil fish)
- ✓ L $\rightarrow$ Loligo (Squid)
- ✓ A $\rightarrow$ Aplysia (Sea hare)
- ✓ P $\rightarrow$ Pinetada (Pearl oyster)
- ✓ C $\rightarrow$ Chiton (Chactopleura)
- ✓ S $\rightarrow$ Sepia (Cuttle fish)



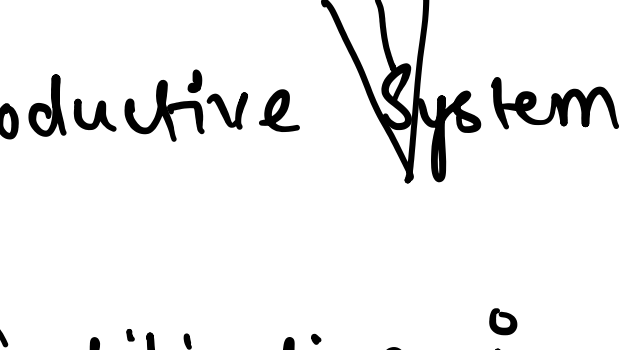
Phylum :- Echinodermata (Echino-spiny dermata=skin)

These animals have an endoskeleton of calcareous ossicles and, hence, named echinodermata (spiny skinned animals) ***

1. Habitat :- Exclusively marine and Benthos (found at Bottom) ***
2. Level of org :- Organ system
3. Symmetry :- Adult-radial larva - Bilateral ***
4. Germ layers :- Triploblastic ✓
5. Coelom :- Eucoelomate (Enterocoelomate)
6. Digestive system :- Complete with mouth on lower or ventral side and anus on upper or dorsal side.
7. Circulatory system :- open type
8. Respiration :- It occur through dermal branchiae & tube feet.
9. Excretory system :- Absent



10. Nervous system :- Consists of circum-oral ring and radial nerve in each arm.



11. Reproductive system :- unisexual organism with no sexual dimorphism. Fertilization is usually external, Development is indirect with free-swimming larva.

* Most distinctive feature of Echinoderm is the presence of water vascular system or ambulacral system, which helps in locomotion, capture & transport of food and respiration. (Autotomy + Regeneration)

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Example :- A $\rightarrow$ Asterias (Starfish)

"Autotomy & Regeneration is well marked"

B $\rightarrow$ Brittle star (Ophiura)

C $\rightarrow$ Cucumaria (Sea cucumber)

D $\rightarrow$ Anti-Don (Sea lily)

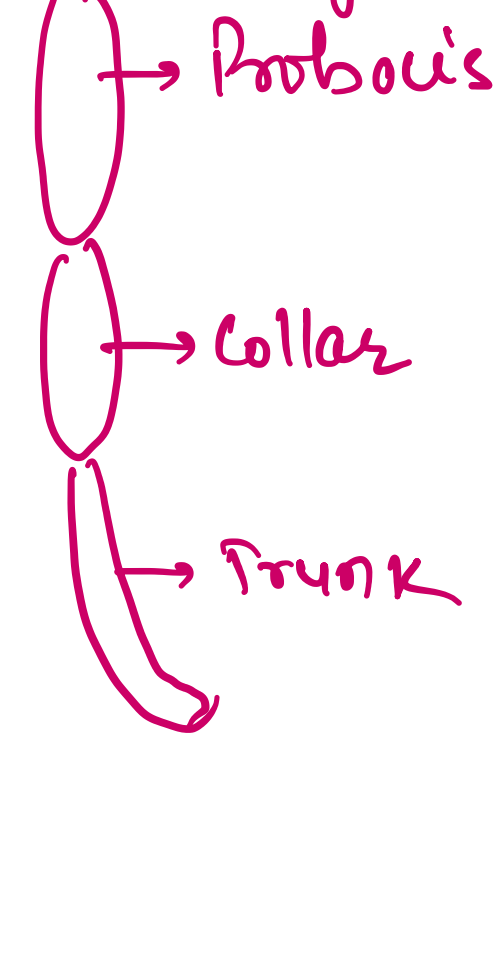
E $\rightarrow$ Echinus (Sea urchin)

✓ Phylum $\Rightarrow$ Hemichordata (consist of a small group of worm-like marine animals)

* Hemichordata was earlier considered as a sub-phylum under chordata. But now it is placed as separate phylum non-chordata.

* Hemichordata have a rudimentary structure in the collar region called stomochord, a structure similar to notochord (Buccal diverticulum)

1. Habitat :- exclusively marine and mostly live in burrows.
2. Level of org :- Organ system
3. Symmetry :- Bilateral
4. Germ layer :- Triploblastic
5. Coelom :- Eucoelomate (Enterocoelomate) ✓
6. Digestive sys :- Complete ✓
7. Circulatory sys :- open type ✓
8. Respiratory sys :- one to several gill slits.
9. Excretory sys :- Single glomerulus situated on proboscis. (Proboscis gland) ✓
10. Nervous system :- Primitive ✓
11. Reproductive system :- • Sexes are separate ✓
 • Fertilization External ✓
 (larva stage + nt)
 • Indirect development ✓



** The body is cylindrical and is composed of an anterior proboscis, a collar and a long trunk.

** Example :- 1. Balanoglossus $\rightarrow$ The acron or tongue worm

2. Saccoglossus