



# ANIMAL KINGDOM

## # Aristotle:

- ↳ Father of Zoology
- ↳ Father of Ancient Taxonomy
- ↳ He classified:

Anaema      Enemia

- RBC's : X
- RBC's : ✓
- Eg: Sponges
- Eg: Vertebrates
- ↳ oviparous: Fish, Amphibian, Reptiles, Aves
- ↳ viviparous: Mammals
- Cnidaria
- Ctenophora
- Mollusc
- Echinodermata

## # TAXONOMY: nomenclature & classification of organisms.

Approx: 1.8 Million organisms  
          ↓  
          1.3 Million Animals

## # Need Of Classification:

- To assign a proper systemic position to already discovered species  
newly discovered species
- Classification: process by which anything is grouped into convenient categories based on observable characters.

## # Basis of Classification:

- Level of Organisation
- Systems
  - └ digestive
  - └ circulatory
  - └ Reproductive
- Symmetry
- Germ Layer
- Coelom
- Segmentation
- Notochord

## ● Level of Organisation:

1. Protoplasmic Level: unicellular

Eg: protozoans

2. Cellular Level: Different cells are arranged as loose aggregates

Dissimilar cells are loosely arranged

Some division of labour present

Eg: Porifera

3. Tissue Level: Similar cells perform common function

Eg: Coelenterata

Ctenophora

4. Organ Level: Diff tissue combine to perform a specific function

Eg: Platyhelminthes & other ↑ phyla

5. Organ System Level: diff tissue combine to perform a specific physiological function.

### A) CIRCULATORY SYSTEM:

open type

closed type

- Blood filled in body cavity (sinuses)

- Tissue directly bath in blood

- Eg: Arthropoda  
Mollusca  
Echinodermata  
Urochordata  
Hemichordata

- Blood always flows in series of blood vessels of varying diameter

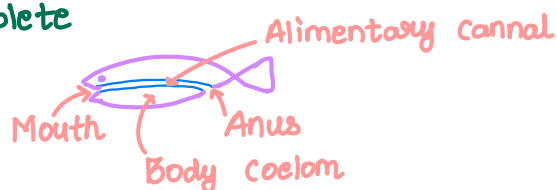
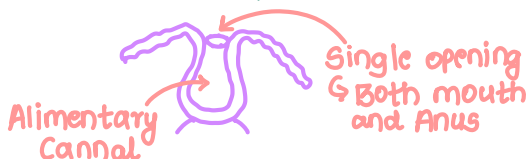
- Tissue is never in contact of blood

- Eg: Annelida  
Cephalopod Mollusc  
Cephalochordata  
Vertebrata.

### B) Alimentary Canal:

Incomplete

Complete



- aka Blind Sac Body Plan  
- Eg: Porifera to Platyhelminthes

- aka Tube within Tube Body Plan  
- Eg: Aschelminthes to chordata

● **Symmetry**: Ability to divide animal into two equal halves.

A) **Asymmetry**: Animal Body can't be divided into equal halves through any plane through center  
Eg: Most of Sponges.

B) **Radial Symmetry**: Any plane passing through central axis of body divides animal into two equal halves.

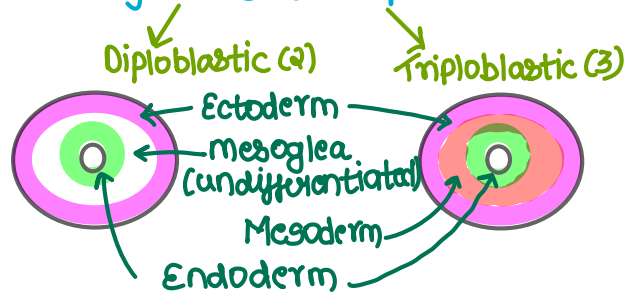


Present in sessile (attached to substratum) animal.  
Eg: Some Sponges  
Cnidocystata  
Ctenophora  
Echinodermata

C) **Bilateral Symmetry**: If animal can be divided into two equal halves at mid lateral plane  
Eg: platyhelminthes to chordates.

● **GERM LAYER**: aka Embryonic layers.

Zygote → Morula → Blastula → Gastrula  
Germ layer is tissue & tissue is absent in porifera  
Germ layer are developed

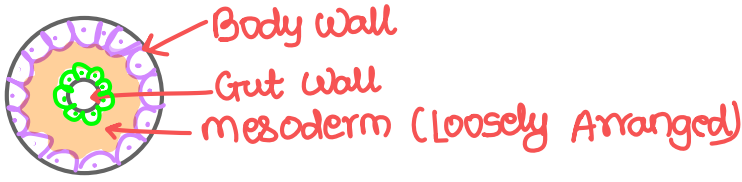


Eg: Cnidocystata  
Ctenophora

Eg: Platyhelminthes  
to chordates

● **COELOM [BODY CAVITY]:** present b/w body wall & Gut wall

A) **Acoelomate:** porifera to platyhelminthes



B) **Coelomate:** True coelom present  
Cavity b/w body wall & Gut wall lined by mesoderm  
Eg: Annelida to chordata.

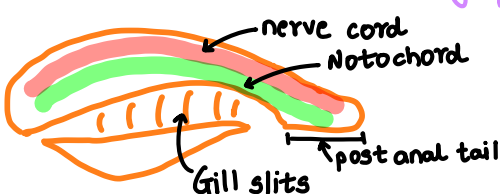


C) **Pseudocoelom:** false coelom  
Body cavity not lined by mesoderm rather it is scattered pouches  
Eg: Aschelminthes

● **SEGMENTATION:** aka metamerism

Body externally & internally divided into segments  
Serial repetition atleast few organs  
Eg: Annelida  
Arthropoda  
chordata

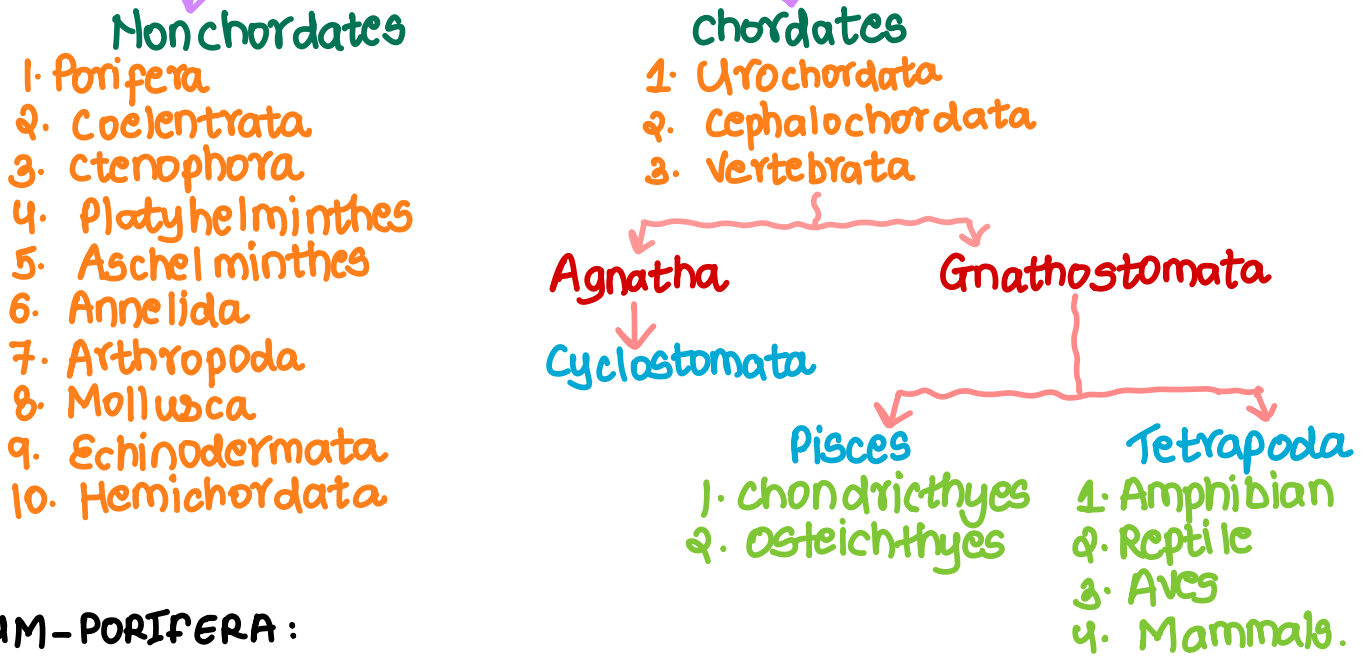
● **NOTOCHORD:** present during embryonic life of all chordates  
It is replaced by vertebral column in most chordates  
On the basis of presence or absence of notochord animals



DRUM  
↑ mesoderm  
Rod like  
Dorsal.

↳ chordates  
↳ Nonchordates

# Kingdom Animalia



## ● PHYLUM - PORIFERA:

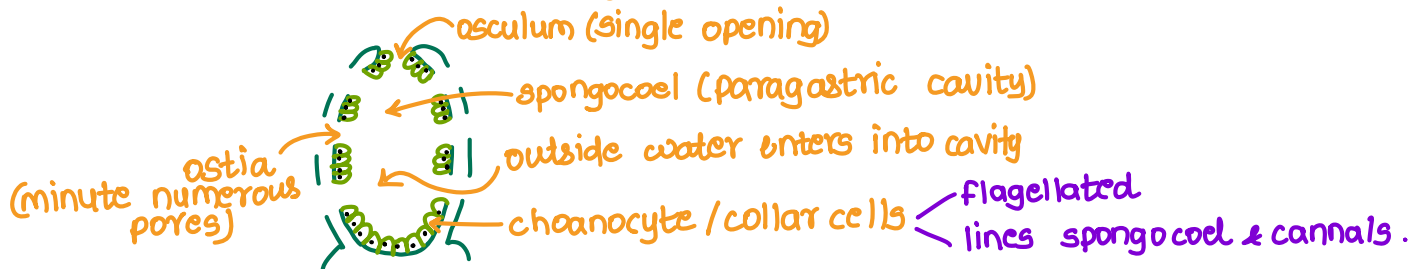
1. Introduction: aka: pore bearing animals  
commonly known as sponges  
most primitive relative of multicellular organisms

2. Habitat: Mostly Marine [Spongilla: fresh water sponge]  
few fresh water.  
Sessile (attached to substratum)  
No locomotion, Solitary / colonial living.

3. Level of Organisation: cellular level of organisation

4. Symmetry: Mostly Asymmetrical

5. Special features: Water Canal System [water transport system]



- 1) Gathering of food
- 2) Respiratory Gases (dissolved  $O_2$ )
- 3) Removal of waste (
  - $N_2$  waste (ammonia)
  - undigested waste food.

6. Digestion: - Sponges are filter feeders (food smaller than ostia)  
- Digestion in choanocytes (intracellular)  
- undigested food removed by canal system  
- Blind Sac Body Plan

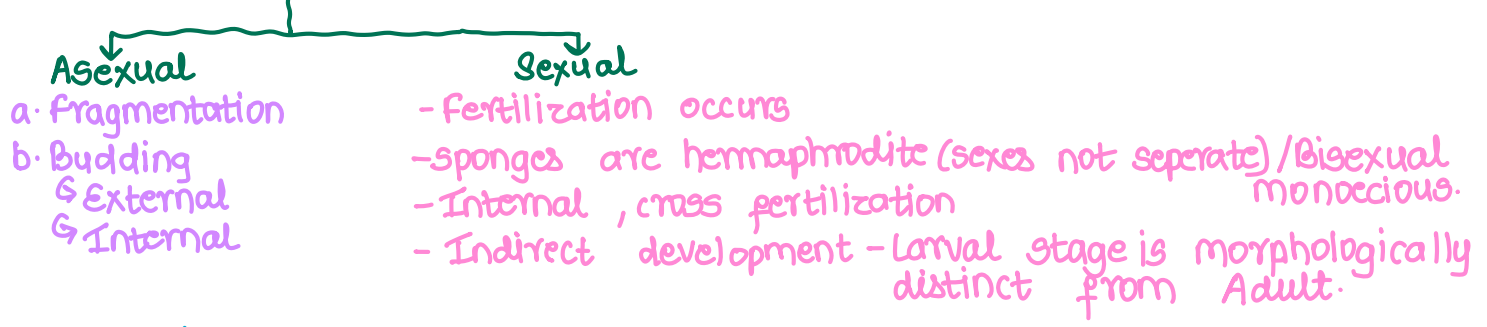
7. Respiration: Canal System  
General Body Surface.

8. Excretion:  $\text{NH}_3$  (Ammonotellic)  
Canal System & General Body Surface

9. Skeleton: Endoskeleton { spicules {  $\text{CaCO}_3$   
silica  
spongin fibres  
(protein).

10. Nervous System: Nerve cell Absent

11. Reproduction:



12. Examples:

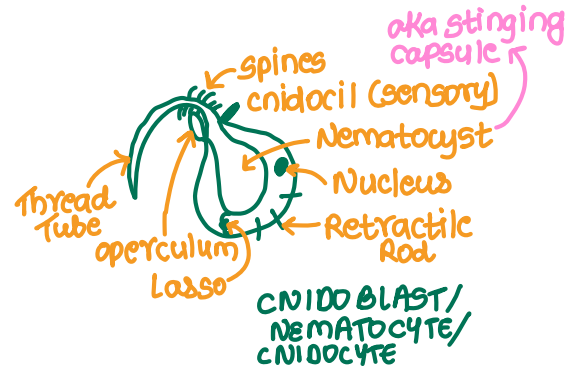
- a. Sycon - Scypha
- b. Euspongia - Bath sponge
- c. Spongilla - Fresh water sponge
- d. Euplactella - Venus Flower Basket
- e. Cliona - Boring sponge.

# ● COELENTERATA :

1. Introduction : aka Cnidaria (cnidoblast)  
Coelenteron : Gastro Vascular cavity.

2. Habitat : Mostly Marine (fresh H<sub>2</sub>O - Hydra)  
Sessile / free swimming

3. Level of Organisation : Tissue level of Organisation  
Symmetry : Radial Symmetry  
Germ layer : Diploblastic  
coelom : Acoelomate



4. Special features : has cnidoblast

- ↳ Anchorage capture of prey Defence.
- ↳ aka Nematocyte
- ↳ present on body surface & tentacles.

cnidaria

5. Digestion : - first Extracellular then Intracellular

coelenteron                      Nutritive Muscular cell lining.



- Incomplete Alimentary (Blind sac Body Plan)  
- Mouth on Hypostome.

6. Respiration : Body Surface

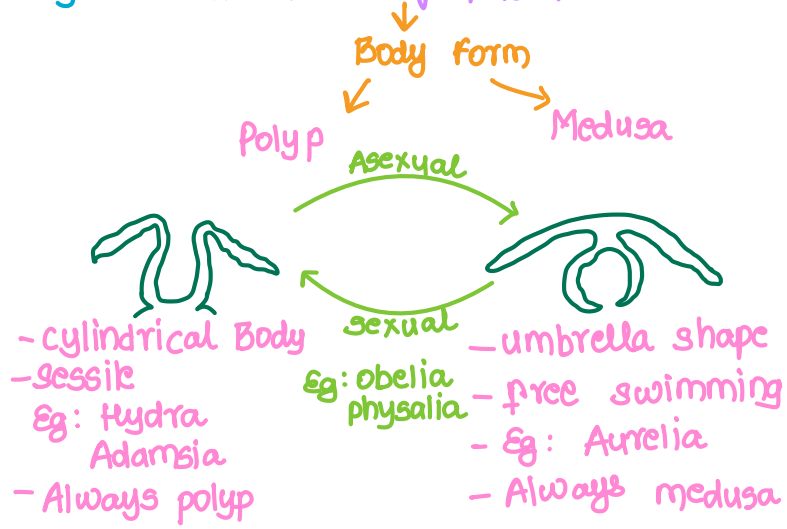
7. Excretion : Ammonotelic  
Body Surface

8. Skeleton : Exoskeleton : CaCO<sub>3</sub>

9. Nervous System : Nerve net  
1<sup>st</sup> time nervous system.

10. Reproduction : Asexual : Budding (External)  
Sexual : External fertilization  
Hermaphrodite  
Indirect Development

11. Metagenesis: Alternation of Generation



12. Examples:
- a. Physalia - Portuguese Man of War
  - b. Obelia - Sea fur
  - c. Gorgonia - sea fan
  - d. Pennatula - Sea pen
  - e. Adamsia - Sea Anemone
  - f. Aurelia - Jelly fish
  - g. Meandrina - Brain coral
  - h. Hydra

## ● PHYLUM: CTENOPHORA

1. Introduction: aka Acnidaria - Cnidoblast Absent  
Ctenos - comb plates, phera - Bearing  
commonly called: sea walnut / comb jellies

2. Habitat: Exclusively marine  
free swimming.

3. Level of Organisation: Tissue level of organisation  
Symmetry: Radial Symmetry  
Germ layer: Diploblastic  
Coelom: Acoelomate

4. Special features: - Body bear 8 external rows of ciliated comb plates  
which help in locomotion.  
- Bioluminescence: property of living organism to emit light in  
darkness.  
- Tentacles  $\begin{cases} \text{absent} \\ \text{present: 2 in no} \\ \text{Bear colloblasts (solid \& adhesive).} \end{cases}$   
- Sense Organ: Statocyst

5. Digestion: Extra & Intra Cellular, Incomplete Alimentary Canal

6. Respiration: Body surface

7. Excretion: Body surface

8. Locomotion: Comb plates

9. Reproduction: Only sexual reproduction  
Sexes not separate  
External fertilization  
Indirect development

10. Examples: Pleurobrachia - Sea Gooseberry  
ctenoplana  
Beroe  
Hormiphora - Sea Walnut

# ● PHYLUM : PLATYHELMINTHES

1. Introduction: aka flatworms

Dorso ventrally flattened

2. Habitat: Most of them endoparasite on animal including Human Beings  
Some are free living (aquatic): Eg Planaria

3. Level of Organisation: Organ / Organ System level of organisation

Symmetry: Bilateral Symmetry

Germ layer: Triploblastic

Coelom: Acoelomate.

4. Special features: PARASITIC ADAPTATIONS

↳ Thick Tegument (cuticle) - protect from digestive enzyme of Host  
↳ presence of Hooks & suckers for attachment (distinct)

← Taenia →  
Fasciola ←

↳ Some absorb nutrient directly from Body Surface.

5. Digestion: Extra & Intra cellular, Incomplete Alimentary Canal

6. Respiration: Body Surface

7. Excretion: Flame cells / solenocytes / Protonephridia ← osmoregulation  
Ammonotellic ← excretion

8. Reproduction: Sexual Reproduction

Hermaphrodite

Internal fertilization

Indirect development many larval stages

9. Examples: Planaria - Dugesia : ↑ Regenerat<sup>n</sup> Capacity

Taenia - Tape Worm

Fasciola - Sheep liver fluke

## ● PHYLUM - ASCHELMINTHES (NEMATODES) :

1. Introduction : Round worms : Body circular in cross section

2. Habitat : - free living  $\begin{cases} \text{Aquatic} \\ \text{Terrestrial} \end{cases}$   
- parasite  $\begin{cases} \text{on animal} \\ \text{on plants} \end{cases}$

3. Level of Organisation: Organ system level of organisation  
Symmetry: Bilateral Symmetry  
Germ layer: Triploblastic  
Coelom: Pseudocoelomate.

4. Digestion: Complete Alimentary Canal.  
Tube within Tube Body Plan.  
Alimentary canal  $\begin{cases} \text{mouth} \\ \text{pharynx (muscular, well developed)} \\ \text{Intestine (non muscular)} \end{cases}$   
Anus

5. Respiration: Gaseous Exchange by Body Surface

6. Excretion: NH<sub>3</sub>  
Excretory tube with Excretory pore present. (Renette cell).

7. Skeleton: pseudocoelomic fluid: Hydrostatic Skeleton

8. Nervous System: Nerve Ring with longitudinal nerves

9. Reproduction: Sexes are separate  
Sexual dimorphism  $\begin{cases} \text{often female are longer than males} \\ \text{caudal end in male is curved} \end{cases}$   
Internal fertilization  
Indirect Development/direct development.

10. Example: Ascaris - Round worm  $\begin{cases} \text{Bancrofti} \\ \text{Malayii} \end{cases}$   
Wuchereria - filarial worm  
Ancylostoma - Hook worm  
Enterobius - pin worm / thread worm.

# ● PHYLUM - Annelida

1. Introduction : Annulus - Little Ring

2. Habitat : Free living   
 Aquatic : Nereis   
 Terrestrial : Pheretima   
 Parasitic - Hirudinaria

3. Level of Organisation : Organ System level of organisation   
 Symmetry : Bilateral Symmetry   
 Germ layer : Triploblastic   
 Coelom : Coelomate (Schizocoelomate)   
 Segmentation : present : metameres present

4. Digestion : Complete Alimentary Canal

5. Respiration : Moist Cuticle

6. Circulation : closed type   
 Exception - Hirudinaria : open

7. Excretion : Nephridia   
 Aquatic : Ammonia   
 Terrestrial : Urea

8. Locomotion : - has longitudinal & circular muscles helps in locomotion   
 - Nereis has parapodia : helps in swimming   
 - Earthworm has SETAE : made up of chitin.

9. Nervous System :



10. Reproduction : Sexes   
 ✓ separate : Nereis   
 ✗ separate : Earthworm   
 Hirudinaria

Fertilization usually external   
 Development   
 direct : Earthworm   
 indirect : Nereis.

Sexual Reproducti

11. Examples : Nereis - Sand Worm   
 Pheretima - Earthworm   
 Hirudinaria - Blood sucking leech

# ● PHYLUM: ARTHROPODA

## 1. Introduction: Arthros: Jointed, Poda: Appendages

- b. All members of Arthropoda have jointed legs. ✓
- c. All animals having jointed legs member of Arthropoda. ✗
- d. Largest phylum (Cover  $\frac{2}{3}$ <sup>rd</sup> of all Animals belong to it)
- e. Insect also belong to it.
- f. Insect study: Entomology
- g. Most Successful Animal on earth

## 2. Habitat: free living terrestrial Aquatic or Parasitic

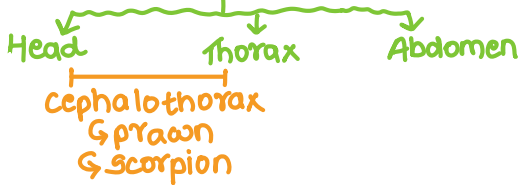
## 3. Level of organisation: Organ system level of Organisation

Symmetry: Bilateral

Germ layer: Triploblastic

Coelom: Coelomate [Schizocoelomate]

Segmented: Body



## 4. Digestion: Complete Alimentary Canal with associated digestive glands. Extra cellular

## 5. Respiration: Insects - Tracheal System

Scorpion - Book Lungs

Prawn - Gills

Limulus - Book Gills.

## 6. Circulation: Dorsal Heart open type

## 7. Excretion: Product - uric Acid

Insect - Malpighian Tubule

Scorpion - Coxal Gland

Prawn - Antennal Gland

## 8. Skeleton: Exoskeleton - made up of chitin (N-Acetylglucosamine) Jointed Appendages

9. Nervous System: a) nerve ring  $\left\{ \begin{array}{l} \text{Paired ganglia} \\ \text{lateral connective} \end{array} \right.$   
 b) nerve cord: Double, ventral, solid

10. Sensory organs: Antenna, Eyes  $\left\{ \begin{array}{l} \text{compound} \\ \text{simple} \end{array} \right.$   
 Statocyst - Balancing organ

11. Reproduction: Sexes separate (mostly)  
 Internal fertilization (usually)  
 Development  $\left\{ \begin{array}{l} \text{direct} \\ \text{Indirect} \end{array} \right.$

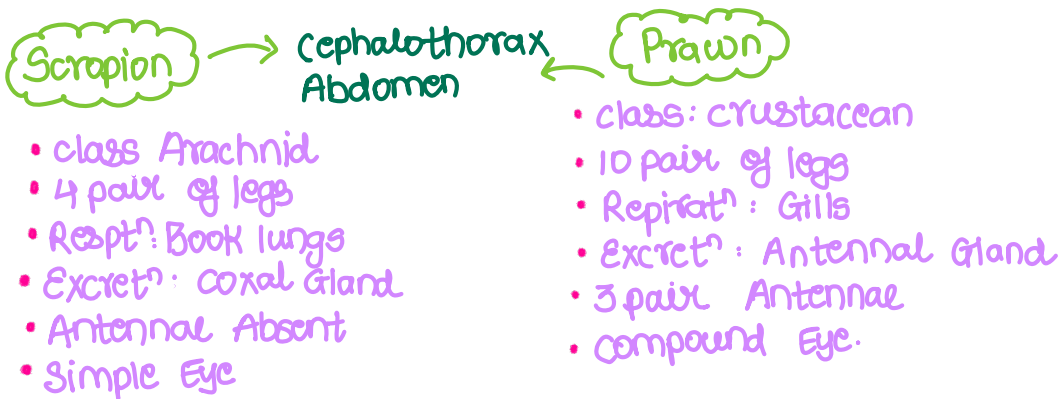
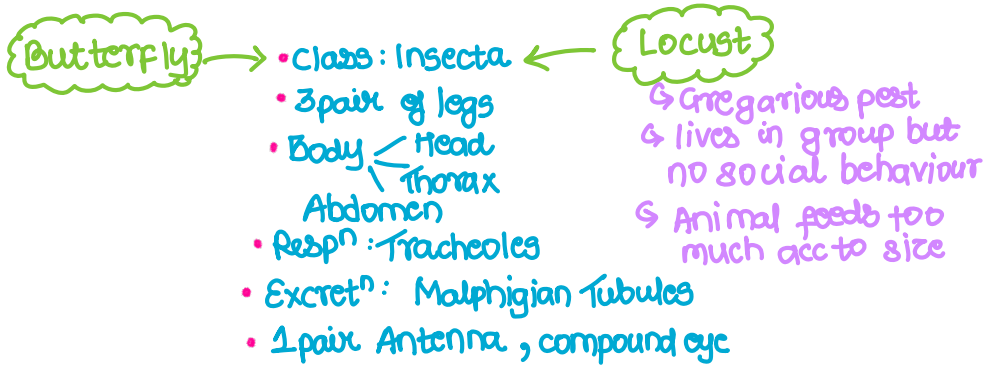
mostly oviparous, scorpion: viviparous.

12. Example: Economically Imp: Apis - Honey bee, Bombyx - Silk worm, lacifer - lac insect  
 Vectors - Anopheles, Aedes, Culex, Musca  
 $\downarrow$   $\downarrow$   $\downarrow$   $\downarrow$   
 Plasmodium Malaria, Dengue, Filariasis, Amoebic dysentery  
 Wuchereria

Gregarious Pest: Locust - Locusta

Living fossil: King crab / Limulus (not evolve from million of years).

Insect: Lepisma - Silver fish.



# ● PHYLUM: MOLLUSCA

1. Introduction: Soft Bodied Animal (MOLLUS)

Second largest Phylum

2. Habitat: free living 

- terrestrial
- Aquatic
  - fresh
  - Marine

 & some parasitic

3. Level of organisation: Organ system level of Organisation

Symmetry: Bilateral

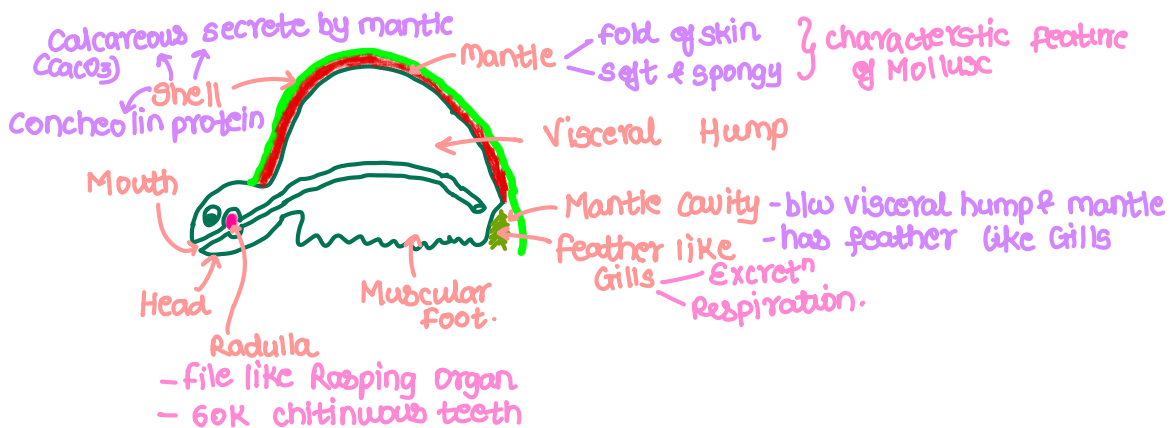
Germ layer: Triploblastic

coelom: coelomate [schizocoelomate]

Segment: Absent

4. Special features: Body parts 

- Head
- visceral Hump
- Muscular foot



5. Digestion: complete, Extracellular

6. Respiration: feather like Gills  
Pigment: Hemocyanin

7. Circulation: open type  
Exception: cephalopod Mollusc - closed.

8. Excretion: feather like Gills

9. Locomotion: Muscular foot

10. Sensory organ: Sensory tentacle  
Eye.

11. Reproduction: Sexes are separate  
External fertilization  
Indirect Development  
Oviparous.

12. Examples:
- a. Pila - Apple snail (Asymmetry)
  - b. Pinctada - Pearl Oyster (Radula Absent)
  - c. Sepia - cuttle fish
  - d. Loligo - Squid
  - e. Octopus - Devil fish Askeleton
  - f. Aplysia - Sea hare Monoecious
  - g. Dentalium - Tusk shell
  - h. Chaetopleura - chiton

# ● PHYLUM - ECHINODERMATA:

1. Introduction : Echino - Spiny , Derm - skin , ata - Possess

2. Habitat : Exclusively Marine [live at sea floor]

3. Level of organisation : Organ system level of Organisation

Symmetry : Bilateral

Germ layer : Triploblastic

Coelom : Coelomate [Enterocoelomate]

Segment : Absent

4. Special features : Water Vascular System

↳ aka Ambulacral System

↳ functions - • Gathering of food

• Locomotion

• Gaseous Exchange

5. Digestion : Complete Alimentary Canal

↳ Mouth : ventral , lower side

Anus : dorsal , upper side

6. Circulation : open type

7. Excretion : System - Absent

Product - Ammonia

Removal - Body Surface

8. Skeleton : made up of Calcareous Ossicles (mesodermal)

↓  
CaCO<sub>3</sub>

↓  
small Bones

Water vascular system

Water transport system

— Gathering of food —

— Respiration —

Locomotion

Removal of waste

Echinodermata

Porifera

9. Nervous System : Nerve Ring

Radial Nerve

External fertilization · usually

10. Reproduction · Heterophrodite

unisexual, dioecious

Indirect development: Larva — Free swimming  
Bilateral symmetry

11. Examples:
- a. Asterias - Star fish
  - b. Echinus - Sea urchin
  - c. Antedon - Sea lily
  - d. Cucumaria - Sea cucumber
  - e. ophiura - Brittle star

## ● PHYLUM - HEMICHORDATA:

1. Introduction: forms U shape burrow at sea shore  
Has stomochord  
group of worm like animals

2. Habitat: Exclusively Marine (Ctenophora, Echinodermata)

3. Level of organisation: Organ system level of Organisation

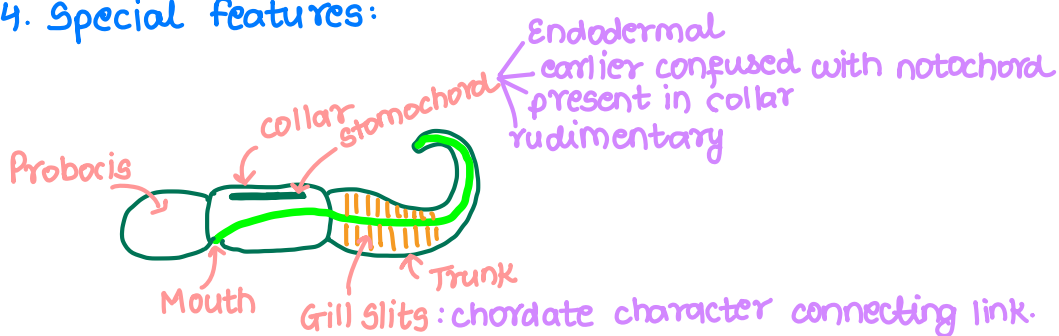
Symmetry: Bilateral

Germ layer: Triploblastic

Coelom: Coelomate [Enterocoelomate]

Segment: Absent

4. Special features:



5. Digestion: Complete Alimentary Canal

6. Respiration: Gills

7. Circulation: open type

8. Excretion: proboscis gland

9. Reproduction: Sexual

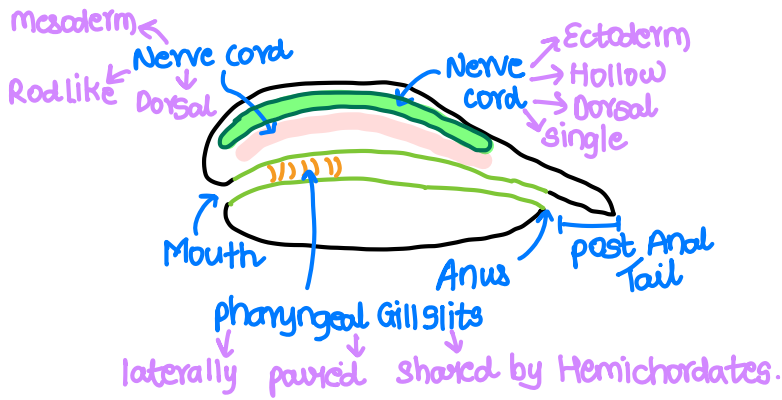
Heterophrodite

External fertilization

Indirect development

10. Examples: Balanoglossus } Tongue Worm  
Saccoglossus }

# ● PHYLUM: CHORDATA



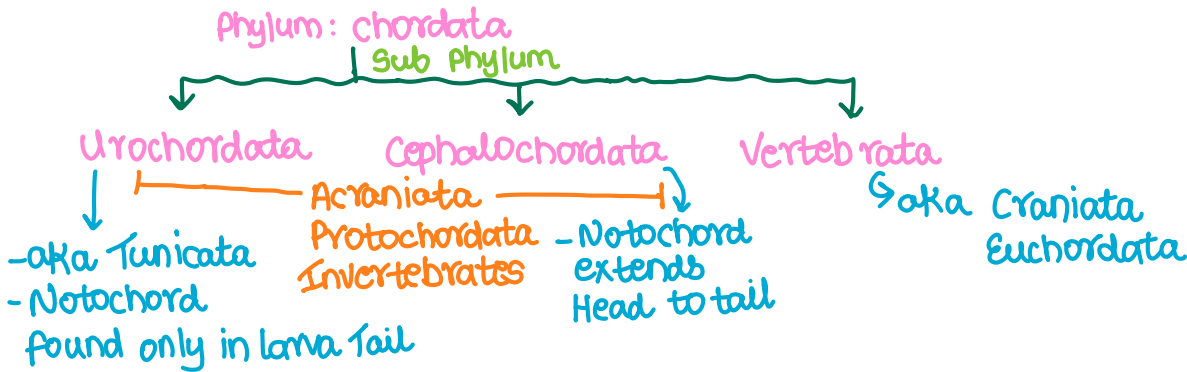
1. Level of Organisation: Organ System
2. Symmetry: Bilateral
3. Germ layer: Triploblastic
4. Coelom: True Coelom
5. Segmentation: Present
6. Notochord: Present
7. Heart Position: Ventral
8. four fundamental features:
  - ↳ Notochord
  - ↳ pharyngeal gill slits
  - ↳ post anal tail
  - ↳ Nerve chord

## ● Difference b/w Non chordates and chordates:

- a. Notochord absent
- b. CNS  $\begin{cases} \text{ventral} \\ \text{solid} \end{cases}$  Double
- c. Gill slits: absent
- d. Heart: Dorsal
- e. Post Anal Tail: Absent
- f. Gut is dorsal to nerve cord

- a. Notochord: present
- b. CNS  $\begin{cases} \text{Dorsal} \\ \text{Hollow} \end{cases}$  single
- c. Gill slits: present
- d. Heart: Ventral
- e. Post Anal Tail: Present
- f. Gut is ventral to nerve cord

## ● Classification:



## ● SUB PHYLUM: UROCHORDATA :

1. Introduction: Notochord only in larva tail  
aka Tunicata: Body covered by Test / Tunic, made up of Tunicin [cellulose like]
2. Habitat: Exclusively Marine  
Larva: free swimming, Adult: sessile
3. Special characters: Retrogressive Metamorphosis  

	Larva	→	Adult
chordate character {	- Notochord ✓		- Notochord x
	- Nerve Cord ✓		- Modify to nerve Ganglion
	- pharyngeal Gill slits: ✓		- pharyngeal Gill slits: x
	- Tail: ✓		- Tail: x
4. Respiration: Gills
5. Circulation: open type
6. Excretion: Neural Gland
7. Reproduction: Hermaphrodite  
External cross fertilization  
Indirect development
8. Example: Ascidia  
Salpa  
Doliolum  
Herdmani: sea squirt / sea potato.

## ● SUB PHYLUM: CEPHALOCHORDATA

1. Introduction: Notochord present from Head to Tail & present throughout life.  
aka Typical chordates: all 4 chordate characters present.
2. Habitat: Exclusively Marine  
free swimming
3. Respiration: Gills
4. Circulation: closed type
5. Excretion: Protonephridia
6. Skeleton: cranium & vertebral column: cartilage.
7. Reproduction: Dioecious  
External fertilization  
Indirect Development
8. Eg: Amphioxus / Lancelet / Branchiostoma

● SUB PHYLUM: VERTEBRATA:

- 1. Notochord replaced by vertebral column in Adult
- 2. All vertebrates are chordates but all chordates are not vertebrates
- 3. Cranium present
- 4. Heart: ventral - 2/3/4 chambers
- 5. Kidneys: osmoregulation & excretion
- 6. Locomotion: Paired Appendages 
 ↙ limbs  
 ↘ fins

● DIVISION : AGNATHA 
 ↙ Jaw Absent  
 ↘ most primitive chordates

⇒ CLASS: CYCLOSTOMATA:

1. Introduction: circular sucking mouth  
 Jaw Absent, Teeth present  
 Ectoparasite on fishes

2. Habitat: Marine water

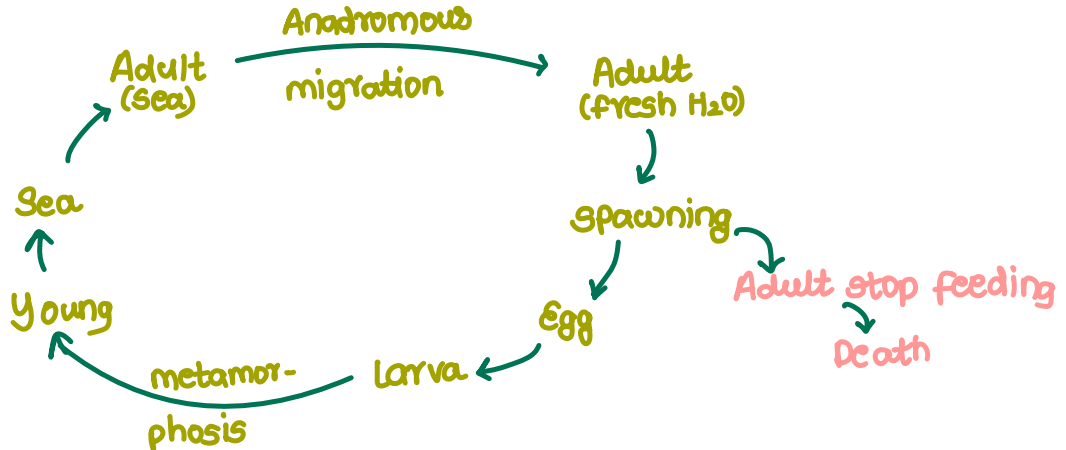
3. Features: - Scales Absent  
 - 6 to 15 pair of gill slits  
 - Paired fins absent, unpaired fins present  
 - Circulation: open type.

4. Examples:

a) Myxine (Hag fish)

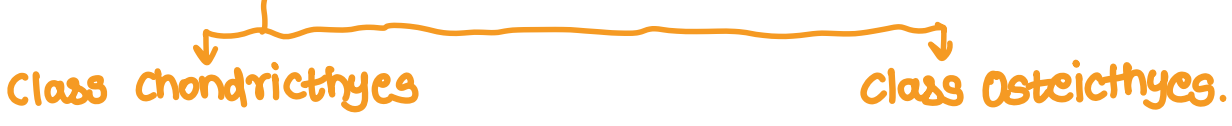
- Hermaphrodite
- Direct development
- Spawning at sea floor

b) Petromyzon (Lamprey)  
 - Heterophrodite



● **DIVISION: GNATHOSTOMATA** { Jaw Present  
Teeth

\* **SUPER CLASS: PISCES [FISHES]**



1. Cartilagenous Endoskeleton
2. All are marine
3. Streamlined Body
4. Skin covered by backwardly directed Placoid Scale
5. Heterocercal Tail
6. Ventral Mouth
  - ↳ predators have powerful jaw
  - ↳ Teeth backwardly directed & modified placoid scales.
7. 5-7 pair of Gill slits
  - ↳ operculum:  $\ominus^{nt}$
8. Air Bladder : Absent
9. 2 chamber Heart : 1A , 1V Poikilotherms
10. Excretory product  
UREA
11. Notochord persistent throughout life , Vertebral Column also  $\oplus^{nt}$
12. Sexes Separate
13. Male bear clasper on pelvic fin
14. Internal fertilization  
Viviparous (Many)
15. Examples :
  - Scoliodon - Dog fish
  - Pristis - Saw fish
  - Carcharodon - Great white shark
  - Trygon - Sting Ray
  - Torpedo - Electric Ray

1. Bony Endoskeleton
2. Fresh water + marine water
3. Streamlined Body
4. Skin covered by backwardly directed ctenoid / cycloid Scale
5. Homocercal Tail
6. Terminal Mouth
7. 4 pair of Gill slits
  - ↳ operculum
8. Air bladder
10. Excretory Product  
Ammonia: Removal by Gills
11. Notochord completely replaced by vertebral column
12. Sexes Separate
13. Claspers absent
14. External fertilization usually Oviviparous
15. Examples:
  - a. Marine: Exocoetus - flying fish  
Hippocampus - Sea Horse
  - b. freshwater : Labeo - Rohu  
Catla - Katla  
Clarias - Magur
  - c. Aquarium: Betta - fighting fish  
Pterophyllum - Angel fish

# ★ Super class : Tetrapoda (2 pair of legs)

⇒ CLASS: AMPHIBIA

↓  
Dual life

1. Habitat: Terrestrial as well as Aquatic [only fresh water]

First chordates to move out of water : yet fertilization in water

2. Body: Head, Trunk & Tail [if present]

Two pair of limbs [if present]

Skin: Moist, Glandular

Scales are absent

Forelimb & Hind limb - Nail / Claw Absent

Eyes have Eyelids

3. Digestion: Alimentary canal, Reproductive Tract, Urinary tract  
open into common chamber

4. Respiration: Skin, Lungs, Gills, Buccopharyngeal cavity

Gills: In larva

5. Circulation: 2A, 1V

Incomplete Double Circulation

Poikilotherms

6. Excretion: Ureotelic, organ: kidney

7. Nervous System: 10 pair of cranial nerve

Ear represent tympanum

8. Reproduction: Heterophrodite

External fertilization

Oviparous

Indirect Development.

9. Examples: Bufo : Toad

Rana : frog

Hyla : Tree frog

Salamandra : Salamander

Ichthyophis : Limbless Amphibia

⇒ Class: REPTILIA

↳ Reptum: creeping / crawling mode of locomotion

1. Habitat: Mostly Terrestrial

2. Body: SKIN-Dry, cornified, covered by scales / scutes → Snakes & lizard shed their skin as skin cast

Limbs - 2 pair (Absent in snakes)

Each has 5 digit

Claw present

3. Respiration: Lungs

4. Circulation: 3 chamber / 4 chamber (crocodile)

Incomplete double circulation

2A, 1V

poikilotherms

5. Excret<sup>n</sup>: Uricotellic

6. Nervous System: 12 pair of cranial nerve

Ear represent tympanum (Ear absent in snakes)

Eyes: movable Eyelids

7. Reproduction: Heterophratite

Internal fertilization

Direct development

Oviparous

8. Examples: chelone - Turtle

Testudo - Tortoise

chameleon - Tree lizard

Calotes - Garden lizard

Crocodylus - Crocodile

Alligator - Alligator

Hemidactylus - Wall lizard

Poisonous snake - Naja - cobra

Bangarus - Krait

Vipera - viper.

## ⇒ CLASS: AVES -

1. Introduction: presence of feathers

Most of them can fly except flightless Bird: Ostrich

2. Body: Head, Trunk, Tail

Skin: dry, glands except oil gland present at their base of tail.

Forelimbs: modified into wings

Hind limbs: have scales & claws: modified for

walking  
swimming  
clasp

3. Digestive Tract: Additional chamber

crop: storage  
gizzard: grinding

presence of beak

4. Respiration: Lungs: Gaseous Exchange

Air Sacs: Supplement Respiration

5. Circulation: 4 chambered Heart

Complete double circulation

Warm blooded [HOMEOTHERMS]

6. Skeleton: Endoskeleton

fully ossified

Long Bones Hollow (air cavities present)

pneumatic Bone

7. Reproduction: Heterophrodite

Internal fertilization

Direct Development

Oviparous

8. Examples: Struthio - Ostrich

Pavo - Peacock

Psittacula - Parrot

Corvus - Crow

Neophron - Vulture

Columba - Pigeon

Aptenodytes - Penguin



