



India's No.1 Study Channel

Animal Kingdom (Part-1)

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1. BASIS OF CLASSIFICATION

- Animals are classified on the basis of certain common fundamental features; they are:
 - A. Levels of organisation of cells
 - B. Body symmetry
 - C. Nature of coelom
 - D. Body plan
 - E. Segmentation of the body
 - F. Pattern of development
 - G. Presence or absence of Notochord

CHARACTERISTIC FEATURES OF DIFFERENT PHYLA –

A. Phylum: Porifera

(Animals are commonly called sponges)

1. They are generally marine, but few like *Spongilla* are fresh-water.
2. They have cellular level of organisation.
3. They are asymmetrical.
4. They have a water canal or water transport

system in which water enters through the minute pores, called ostia in the body wall and reaches the central cavity, called spongocoel and goes out through the large terminal opening, called osculum; spongocoel and the radial canals are lined by choanocytes or collar cells.

This pathway helps in food gathering, respiratory exchange of gases and removal of metabolic wastes. 5. The body is supported by a skeleton of spicules or spongin fibres.

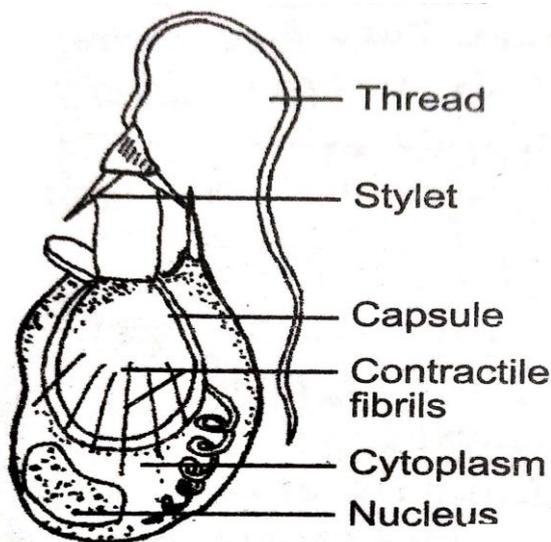
6. Digestion is intracellular.
7. Animals reproduce asexually by fragmentation (regeneration) and by gemmules.
8. Animals are hermaphrodite/bisexual; fertilisation is internal and development is indirect with a free-swimming larva e.g., *Sycon*, *Euspongia*, *Spongilla*, etc.



B. Phylum: Cnidaria –

(Animals are also called coelenterates, as they have a central gastrovascular cavity)

1. Animals are aquatic, mostly marine and a few are freshwater forms.
2. They show tissue level of organisation and are diploblastic.
3. Animals are radially symmetrical.
4. The name cnidaria is derived from cnidoblasts or cnidocytes, which contain the stinging cells, called nematocytes, present on the tentacles and the body wall; cnidoblasts are meant for anchorage, defence and capture of prey.
5. They have a central gastrovascular cavity, with a mouth opening on the hypostome.
6. Digestion is partly intracellular and partly extracellular.
7. Some cnidarians (like corals) have a skeleton composed of calcium carbonate.



8. Cnidarians show two basic body forms - Polyp and Medusa.

- Polyp is sessile and cylindrical in Hydra and Adamsia.
- Medusa is free-swimming and umbrella like as in Aurelia and Physalia.
- Cnidarians like Obelia exist in both the forms and exhibit alternation of generations (metagenesis), where the polyps produce medusae by asexual reproduction and medusae produce polyps by sexual reproduction, e.g., Pennatula, Gorgonia, Physalia, Adamsia, Meandrina, etc.



C. Phylum: Ctenophora

(Animals are commonly called sea walnuts or comb jellies)

1. They are exclusively marine.
2. They have tissue level of organisation and are diploblastic.
3. They are radially symmetrical.
4. The body bears eight external rows of ciliated comb-plates, which help in locomotion.
5. Digestion is partly extracellular and partly intracellular.
6. Bioluminescence is well marked.
7. Animals are hermaphrodite and reproduce only sexually; fertilisation is external and development is indirect. e.g., Pleurobrachia, Ctenoplana.

D. Phylum: Platyhelminthes

(Animals are called flatworms, because their body is dorso-ventrally flattened)

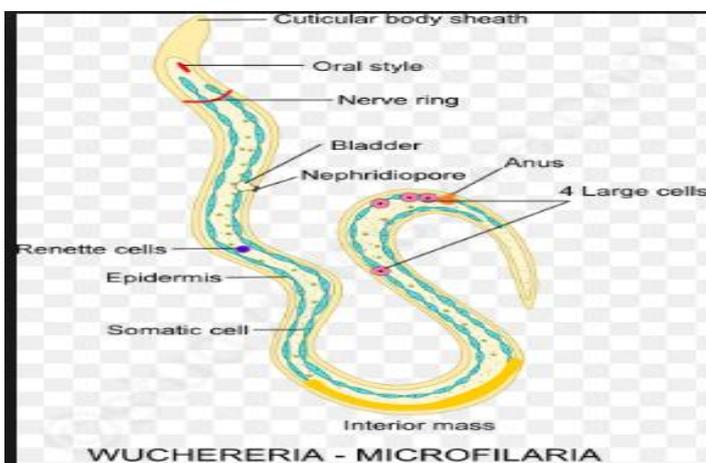
1. Animals are mostly parasitic (endoparasites), on other animals including human beings.
 2. They show organ level of organisation (some show organ-system level) and are triploblastic.
 3. They are bilaterally symmetrical.
 4. They are acoelomates.
 5. Parasitic forms have hooks and suckers; some of them absorb the nutrients from the host directly through their body surface.
 6. Specialised cells, called flame cells, perform excretion and osmoregulation.
 7. Animals show non-metameric segmentation.
 8. Animals are hermaphrodite; fertilisation is internal and development includes many larval stages. (Self-fertilisation occurs mostly)
 - Planaria has high regeneration capacity.
- e.g., Taenia, Fasciola, etc.



E. Phylum: Aschelminthes

(Animals are called round worms, because the body has a circular outline in cross-section)

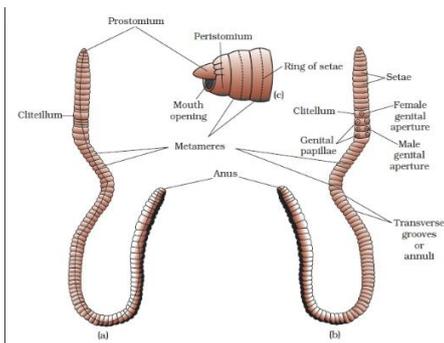
1. They are free-living (terrestrial or aquatic), or parasitic on plants or animals.
2. They have an organ-system level organisation and are triploblastic.
3. They are bilaterally symmetrical.
4. Digestive system is complete with a mouth opening and an anal opening; pharynx is well-developed and muscular.
5. Animals are pseudocoelomates.
6. An excretory tube removes the wastes from the body cavity through an excretory pore.
7. Animals are unisexual/dioecious and show sexual dimorphism; fertilisation is internal and development is direct in some and indirect in some. e.g., *Ascaris*, *Wuchereria*, *Ancylostoma*, etc.



F. Phylum: Annelida

(Animals are called annelids, because their body surface is marked into ring-like (annulus: little ring) segments.)

1. Animals are terrestrial, aquatic-marine or freshwater or parasitic.
2. They show organ-system level of organisation and are triploblastic.
3. They are bilaterally symmetrical.
4. They show metameric segmentation, where the body surface is distinctly marked into segments, called metameres.
5. Locomotion is aided by longitudinal and circular muscles; chaetae are meant for locomotion and aquatic animals have parapodia, the triangular projections from the body.
6. Animals have a closed circulatory system, with ventral hearts and blood has haemoglobin, dissolved in plasma.
7. Respiration is through moist skin.
8. Nephridia help in excretion and osmoregulation.
9. Nervous system consists of paired ganglia connected by double-ventral nerve cord.
10. Animals are bisexual/hermaphrodite; sexual reproduction involves internal fertilisation (only cross fertilisation) and development is direct or indirect. e.g., *Pheretima*, *Hirudinaria*, *Nereis*, etc.



Earthworm

G. Phylum: Arthropoda

(This is the largest phylum of animal kingdom; animals possess jointed appendages (arthrosjointed, poda-appendages) and hence called arthropoda).

1. Body is divided into head, thorax and abdomen; in Crustaceans and Arachnids, head and thorax are fused to form cephalothorax.

- Body is covered by a chitinous exoskeleton.

2. They have organ-system level of organisation and are triploblastic.

3. They are bilaterally symmetrical.

4. The digestive system is complete.

5. Circulatory system is of open type; the body fluid, haemolymph is present in the haemocoel.

6. Respiration is by tracheal system, book lungs, gills, etc.

7. Nervous system includes a brain, segmental ganglia and double ventral nerve cord; sense organs are antennae, simple/compound eyes, statocysts/balancing organs, etc.

8. Excretion is by malpighian tubules.

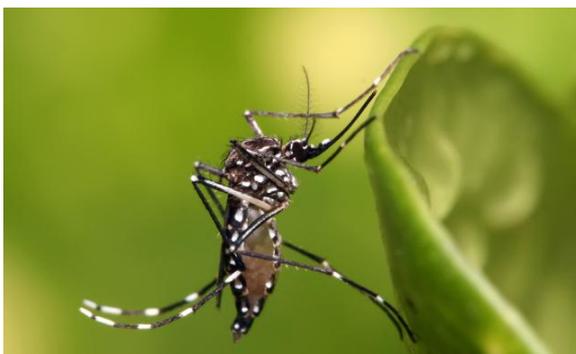
9. Animals are unisexual; fertilisation is internal and development may be direct or indirect. g.,

(a) Economically useful insects: Bombyx, Laccifer, Apis.

(b) Vectors that spread the diseases: Anopheles, Culex, Aedes.

(c) Gregarious pest: Locusta.

(d) Living fossil: Limulus.



H. Phylum: Mollusca

(It is the second largest phylum of animal kingdom that includes soft-bodied (mollis-soft) animals)

1. Animals are aquatic-both marine and freshwater and when terrestrial, found in moist places.
2. They show organ-system level of organisation and are triploblastic.
3. They are bilaterally symmetrical, but in some symmetry is lost due to torsion.
4. Body is divided into head, visceral mass hump and a muscular foot; a soft spongy layer of skin, called mantle is formed over the visceral mass. - The space between the mantle and the visceral mass, is called mantle cavity.
5. Gills/ctenidia are present in the mantle cavity and they are respiratory and excretory in function.
6. Circulatory system is of open type and body fluid has haemocyanin.
7. The mouth contains a file-like rasping organ called radula.
8. Animals are unisexual; fertilisation is internal and development includes larval stages, i.e., it is indirect. e.g., Pila, Pinctada, Sepia, Octopus, Aplysia, Dentalium, Chaetopleura, Loligo, etc.



I. Phylum: Echinodermata

(They have an endoskeleton of calcareous ossicles (echinus-spiny and derma-skin) and are spiny skinned)

1. Animals are exclusively marine.
2. They show organ- system level of organisation and are triploblastic.
3. The adults are radially symmetrical and larvae are bilaterally symmetrical.
4. Digestive system is complete with a ventral mouth and a dorsal anus.
5. Presence of water vascular system is a distinct feature; it helps in locomotion, food capture and its transport and respiration.
6. An excretory system is absent.
7. Animals are unisexual and fertilisation is external; development is indirect with free swimming, bilaterally symmetrical larvae. e.g., Asterias, Antedon, Cucumaria, Ophiura, Echinus, etc.

J. Phylum: Hemichordata

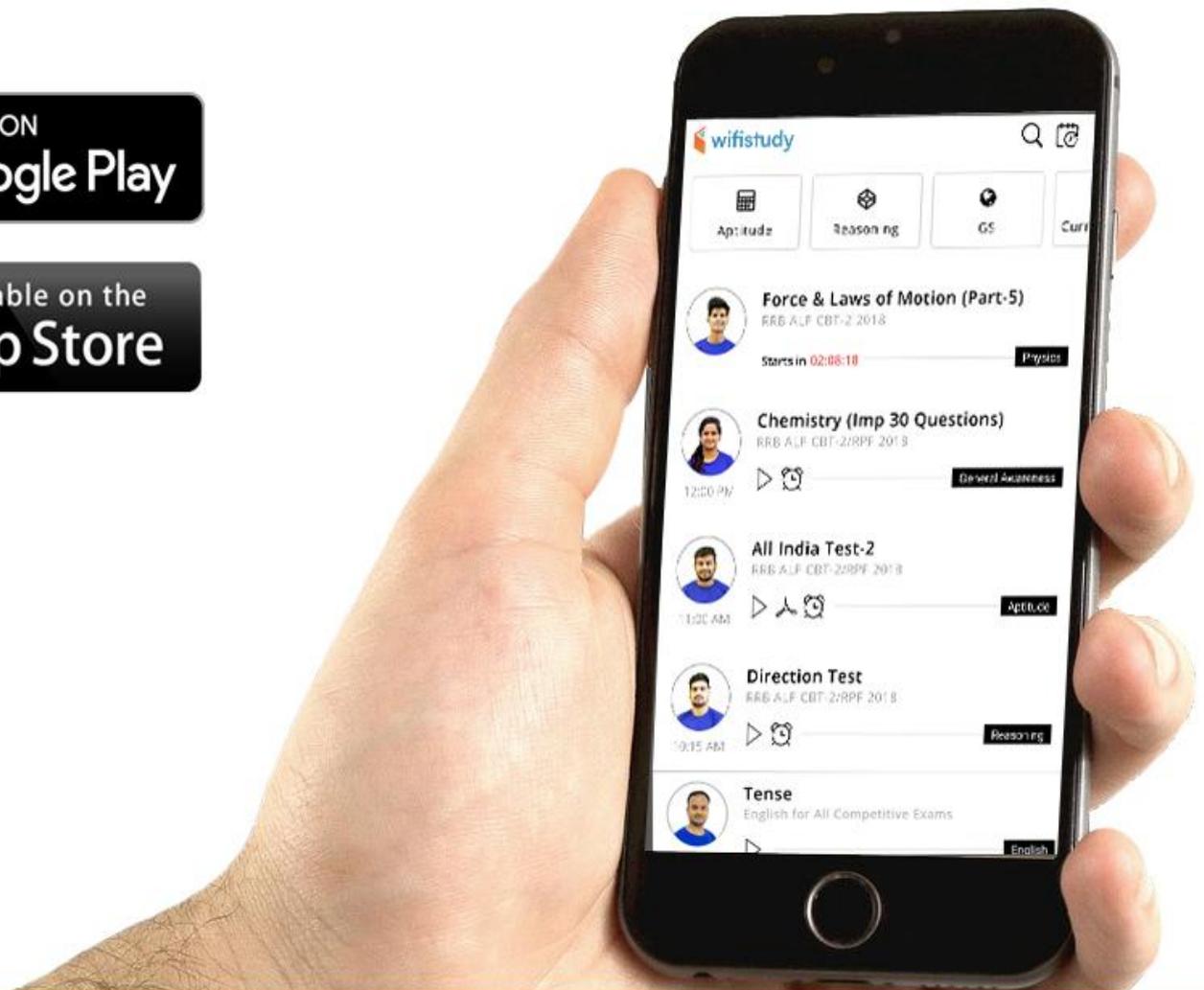
(This phylum was kept under Chordata as a sub-phylum, but now is made a separate phylum under non-chordata)

1. Animals are worm-like and exclusively marine.
2. They exhibit organ-system level of organisation and are triploblastic.
3. They are bilaterally symmetrical.
4. Body is divided into proboscis, collar and trunk.
5. Respiration is by gills.
6. Circulatory system is of open type.
7. Proboscis gland is the excretory organ.
8. Animals are unisexual; fertilisation is external and development is indirect. e.g., *Balanoglossus*, *Saccoglossus*, etc.





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