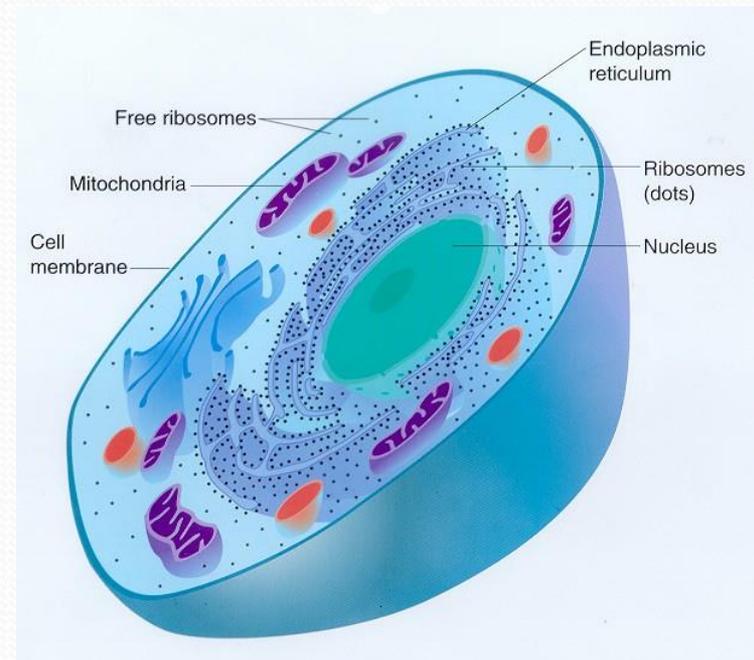


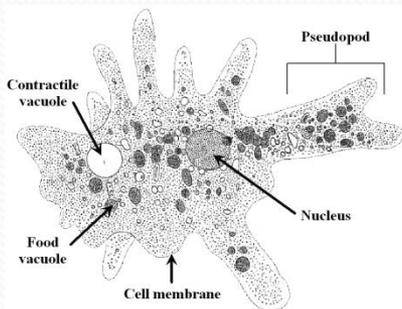
DIVERSITY IN LIVING ORGANISMS





What is Bio Diversity?

Bio diversity is the co-existence of a wide variety plants animals and micro-organisms in a natural habitat within a particular environment



Introduction



- Each living organism is different from other organisms.
- Different life forms have different colours, shapes and sizes. (Eg: bacteria, whales)
- Huge difference in life spans (Eg: mosquitoes, pine trees)
- Similarities among organisms - help to classify and group them.
- Fundamental differences in the characteristics of Organisms help us to create Main Groups
- Sub groups can be decided by less important characteristics.

Basis of Classification

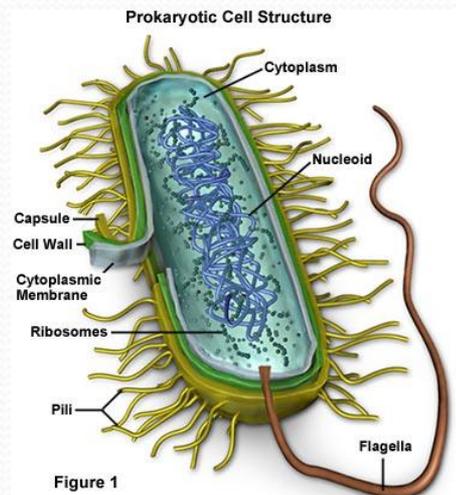
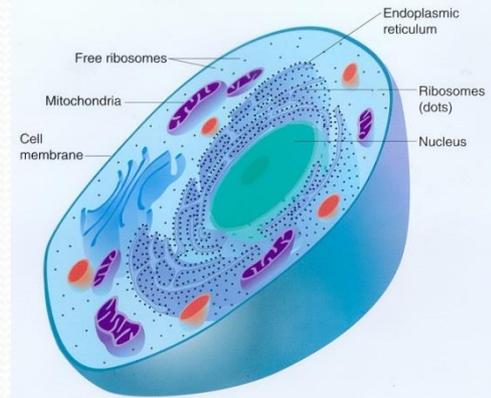
- Greek Philosopher Aristotle classified animals according to the place they live (Air, Water & Land)
- But this is not an appropriate way because animals living in same place have lot of differences in the characteristics. (Eg. Corals, whales, Octopuses)
- Hence we have to decide which characteristics are to be used to make the broadest divisions
- Then we have to identify the next set of characteristics for making sub groups
- This process continues using new characteristics each time.

What is meant by characteristics?

- Characteristics are ways through which we can group some living organisms
 - Form (eg: man has five fingers)
 - Function (eg: animals can move but trees cannot)
- Fundamental characteristics and Dependent characteristics
(eg: brick wall is made up of stones of different shapes and sizes - lower layer independent and upper layer dependent)

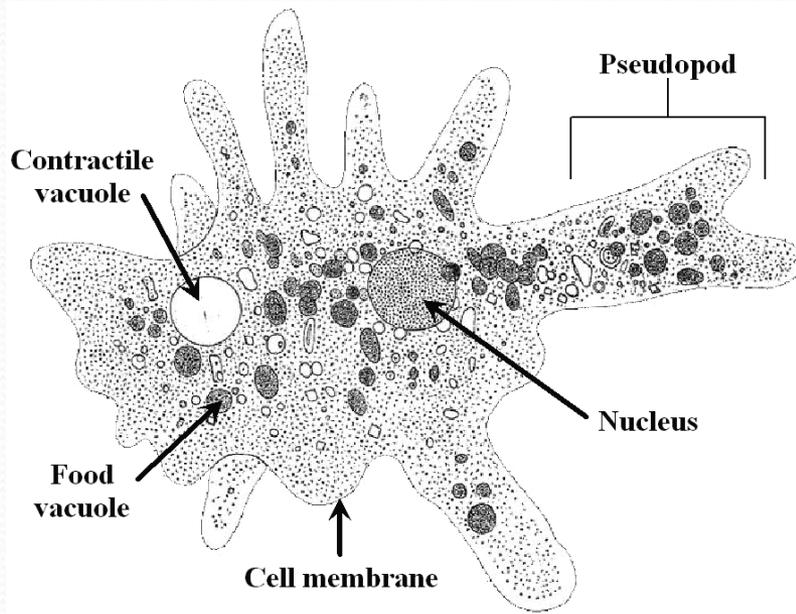
Characteristics of organisms

- We use inter-related characteristics of the cells to classify all living organisms
- A Eukaryotic cell has a membrane bound organelles including a nucleus.
- They have the capacity in making a multicellular organism
- A prokaryotic cell does not have a demarcated nucleus and other organelles and has biochemical pathways organised in different ways.
- So we can conclude that the type of cell is a basic characteristics of classification



Characteristics of organisms

- Cells occur as single or in groups to form different organisms



Single celled amoeba



Multicellular worm

Characteristics of organisms

- Organisms producing own food and those depending on others



Green Plant - produces its own food Animal - dependent on others

- Hence the Characteristics used for classification of plants will be different from classification of animals

Classification & Evolution

- Living things are identified and categorised on basis of their body design in form and function.
- Classification of life forms closely related to their evolution.
- Accumulation of changes in body design allow organism to survive better.
- Charles Darwin described the idea in 1859 in "The Origin of Species".
- Organisms which have ancient body designs that have not changed very much - 'primitive' or 'lower' organisms.
- Organisms that have acquired their particular body designs relatively recently - 'advanced' or 'higher' organisms
- Complexity in design and characteristics:
 - Older organisms - simpler
 - Younger organisms - more complex.

Hierarchy of Classification - Groups

- Ernst Haeckel (1894) , Robert Whittaker (1959) and Carl Woese (1977) classified organisms into Broder categories called KINGDOMS
- Robert Whittaker proposed 5 Kingdoms:
 - Monera
 - Protista
 - Fungi
 - Plantae
 - Animalia
- Basis of grouping of these kingdoms:
Cell structure, Mode & Source of Nutrition and Body Organisation
- Woese further divided Monera into:
 - Archaeobacteria (Archaea)
 - Eubacteria (Bacteria)

Hierarchical Classification

- Kingdom
 - Phylum (animals) / Division (Plants)
 - Class
 - Order
 - Family
 - Genus
 - Species
- Species is the basic unit of classification. It includes all organisms capable of breeding to produce fertile offspring.

Hierarchical Classification

- Genus : A group of closely related species that forms a category higher than species.
- Family : A number of Genera having common characteristics form a family
- Order : A number of families having common characteristics are placed in an Order
- Class: A number of Orders having similarity are placed together in a Class.
- Phylum : Many Classes with some specific common characteristics are included in a phylum
- Kingdom : It is the highest category of classification studies. All animals are included in the Animal Kingdom and all plants are included in the Plant Kingdom

Example:

Kingdom - Animalia

Phylum - Chordata

Class - Mammalia

Order - Primata

Family - hominidae

Genus - Homo

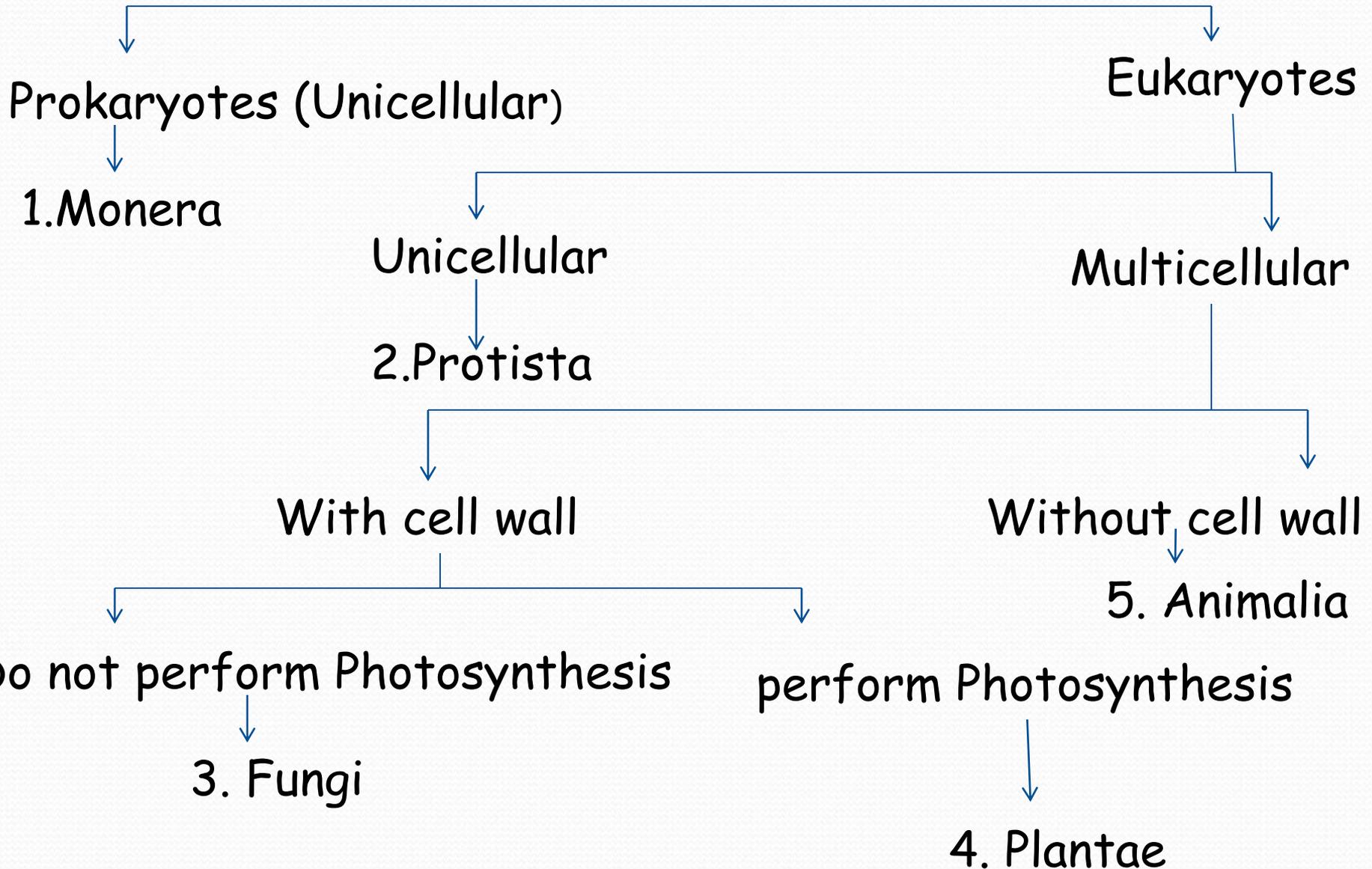
Species - sapiens

Homo sapiens

Robert Whittaker's five Kingdoms

1. Monera
2. Protista
3. Fungi
4. Plantae
5. Animalia

ORGANISMS



Answer the following

1. Name the seven basic hierarchical categories.
2. CT What are the basis of grouping of organisms into five kingdoms?

HOT

1. How are the multicellular organisms sub grouped into Whittaker's classification?

HW

Draw the flow chart showing the five kingdom of classification.

KINGDOM MONERA

Characteristics

- Organisms do not have defined nucleus or organelles (prokaryotes)
- Unicellular body design
- The diversity in characteristics of Monera:
 - Having a cell wall Eg. blue green algae or
 - No cell wall Eg. mycoplasma
- Mode of Nutrition:
 - Synthesising own food -Autotrophic - Blue green algae, some bacteria
 - Heterotrophic - mycoplasma, most of the
- Monera include:
 - Bacteria
 - Blue-green algae or Cyanobacteria
 - Mycoplasma



KINGDOM PROTISTA

Characteristics

- Unicellular eukaryotic organisms
- Movement using appendages like:
 - Cilia
 - Flagella
- Protista include:
 - Algae
 - Diatoms
 - Protozoans



KINGDOM PROTISTA

- Mode of Nutrition:

- Either autotrophic as in algae and diatoms or
- Heterotrophic as in protozoans

- Movement:

- Some of the organisms use appendages such as hair-like cilia or whip-like flagella
- Amoeba moves by pseudopodia
- Eg. Algae, diatoms, Euglena and protozoans(amoeba)

KINGDOM- FUNGI

- Eukaryotic, non-green organisms
- Mode of nutrition:
Heterotrophic Saprophytic
- Body of fungi - Mycelium
- Made of number of fine thread like hyphae
- Some of them can become multicellular at certain stage of their lives.
- Cell-walls made up of tough complex sugar - chitin
- Some fungi live in symbiotic relationship - lichens
- Fungi include:
Yeast, Mushroom, Moulds, Penicillium



Kingdom PLANTAE

Characteristics

- Multicellular eukaryotes with cell-wall
- Mode of nutrition:
 - Autotrophic
- Use chlorophyll for photosynthesis
- Plantae includes all plants.
- First level of classification among plants - whether the plant body has well differentiated, distinct components
- second level of classification - whether the plant body has vascular tissues for transport of H_2O and food materials
- third level of classification - based on ability to bear seeds and whether the seeds are enclosed within the fruits.

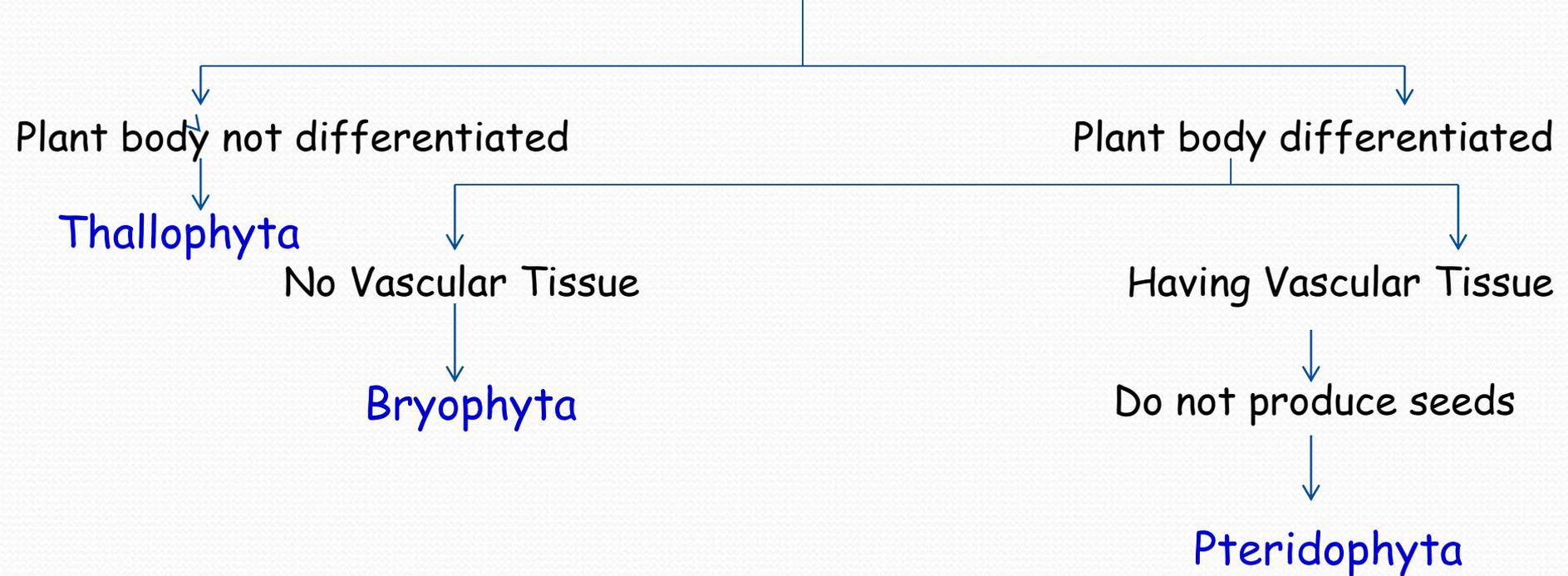


Kingdom : PLANTAE

Sub Kingdom :

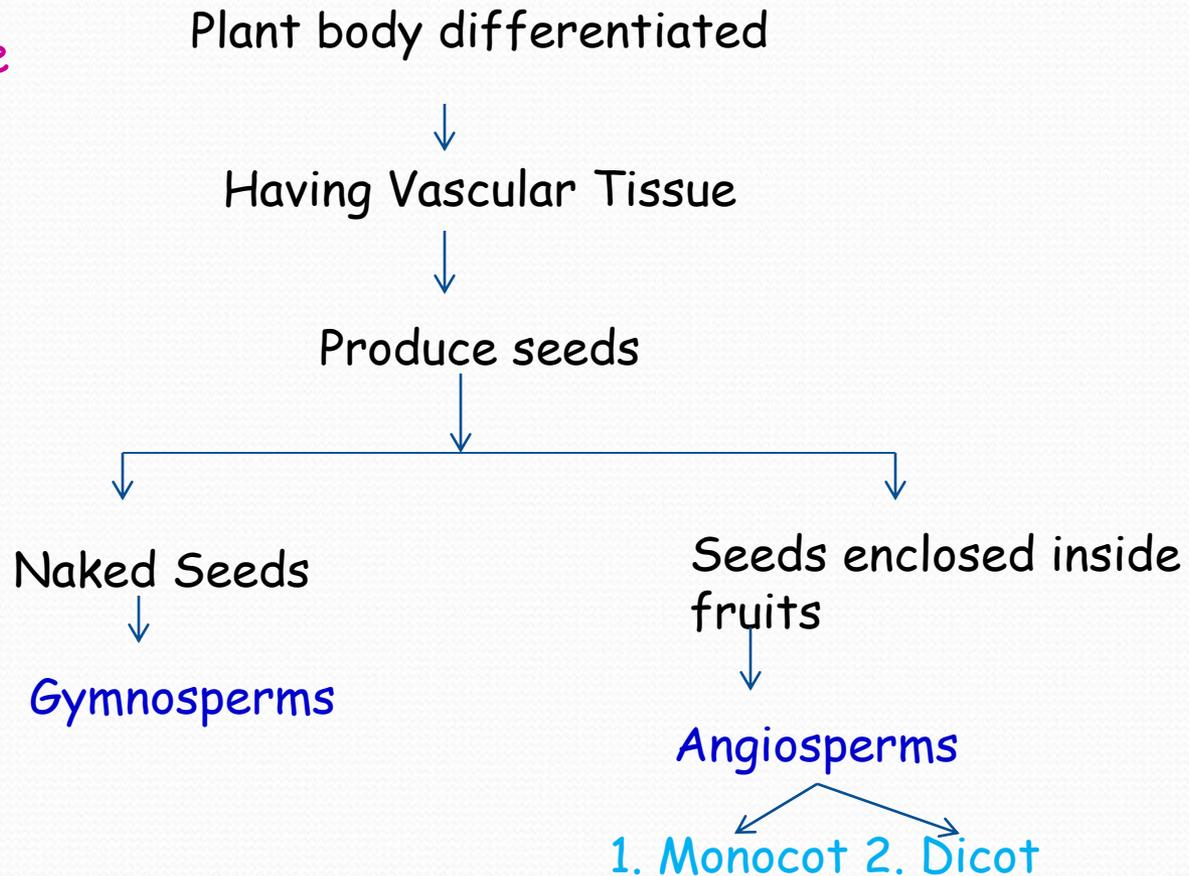
- 1. Cryptogamae 2. Phanerogamae

Cryptogams



Kingdom : PLANTAE

Sub Kingdom :
2. Phanerogamae



Kingdom : ANIMALIA

ANIMALIA

- Multicellular eukaryotes without cell-wall
- Mode of nutrition:
 - Heterotrophs, Holozoic nutrition
- Animalia includes animals and human beings.
- Growth is limited, definite shape, size and symmetry.
- mobile
- Classification is based on the extent and the type of the differentiation of the body.
 1. cellular level of organization
 2. tissue level of organization
 3. organ level of organization
 4. organ system level of organization



Kingdom : ANIMALIA

Based on the different level of classification Kingdom animalia is grouped into different PHYLUM as follows:

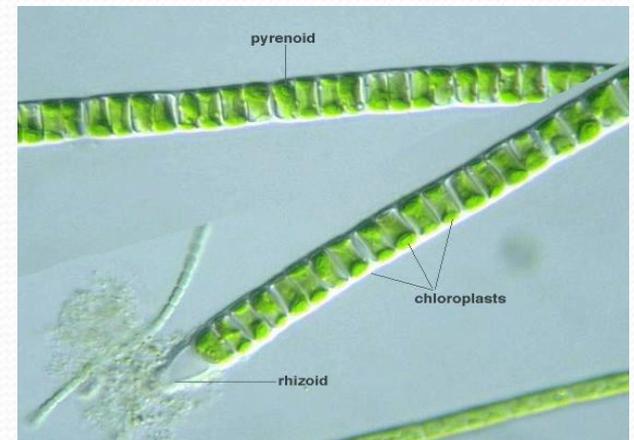
1. PORIFERA
2. COELENTRATA
3. PLATYHELMINTHES
4. NEMATODA
5. ANNELIDA
6. ARTHROPODA
7. MOLLUSCA
8. ECHINODERMATA
9. PROTOCHORDATA
10. VERTEBRATA



Kingdom : PLANTAE

DIVISION : THALLOPHYTA

- **Thallus** -undifferentiated, **phyta**-plant
- Plants do not have well differentiated body design
- Plants in this group are commonly called algae
- Predominantly aquatic plants
- Algae are green thallophytes autotrophic that contain chlorophyll
- Eg. Algae (Spirogyra, Ulothrix, Cladophora, Chara)



DIVISION BRYOPHYTA (Bryon-moss)

- They are the first amphibians of the plant kingdom i.e.. They live on land and in water.
- Plant body is differentiated to form stem and leaf like structures.
- There is no specialised tissues for the conduction of water and other substances
- Eg. Moss (Funaria) and Liverworts (Riccia, Marchantia)



DIVISION PTERIDOPHYTA

- They are the first land plants having vascular tissues
- Plant body is differentiated into roots, stem and leaves
- They have specialised tissues for conduction of water and other substances from one part of the plant body to another.
- Eg. Marsilea, Ferns and Horse-tails



CRYPTOGAMAE

- The reproductive organs in the thallophytes, the bryophytes and pteridophytes are hidden and are very inconspicuous
- External flowers or seeds are absent and they have naked embryo called SPORES.
- The plants in these three groups are therefore called 'CRYPTOGAMAE'

PHANEROGAMAE (Phaneros - visible)

- They have well-developed reproductive organs and produces seeds
- Plant body is differentiated into distinctive parts.
- Have well developed vascular tissues
- Seeds consists of the embryo along with stored food (provides nutrition for the growing embryo)
- **Classification of Phanerogams:**
- **Gymnosperms**
- **Angiosperms**

GYMNOSPERMS

- These are naked seeded plant (not enclosed within a fruit)
- Plants are usually perennial, evergreen and woody.
- The flowers are represented by unisexual cones, both being present on the same plant.
- Pollination by wind.
- Eg. Pinus, Cycas, Deodar



ANGIOSPERMS (Angio - covered, sperma-seed)

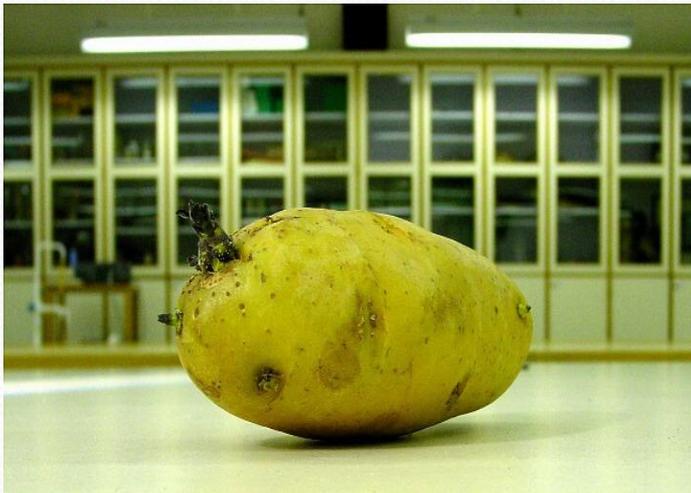
- Most common flowering plants
- They are seed-bearing plants
- Seeds develop inside an organ which is modified to become a fruit
- Evergreen, annual or perennial herbs, shrubs or trees.
- Plant embryos in seeds have 'cotyledons'
- 'Cotyledons' - 'seed leaves' - they emerge and become green when the seed germinates.
- Angiosperms are divided into two groups on the basis of cotyledons present in the seed
- (i) **Monocotyledonous or Monocots**: Seeds having a single cotyledon eg. Maize, Rice, Wheat, etc.
- (ii) **Dicotyledonous or Dicots**: Seeds having two cotyledons
- eg. pea, gram, bean, etc.

ANGIOSPERMS (Angio - covered)

(i) **Monocots:** Seeds having a single cotyledon eg. Maize, Rice, Wheat, etc.

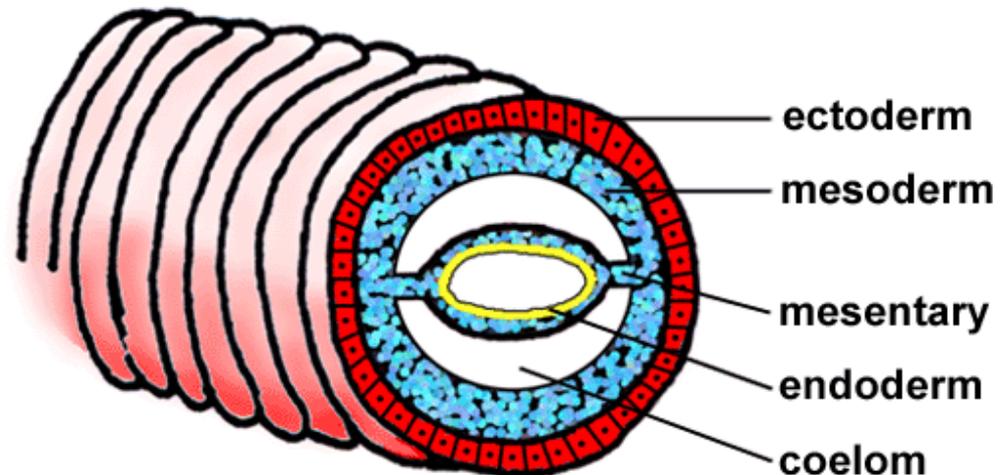


- (ii) **Dicots:** Seeds having two cotyledons
- eg. pea, gram, bean, etc.



Kingdom Animalia - Definitions

- **DIPLOBLASTIC:** Two germinal layer - outer ectoderm and inner endoderm. Mesoderm is absent. Eg. Porifera, Coelenterata.
- **TRIPLOBLASTIC:** Three germinal layers are present. Eg. Platyhelminthes to Chordata.
- **COELOM:** Is the body cavity. Mesoderm layer is filled with fluid. It is the space between alimentary canal and body wall protecting various body organs.
- **ACOELOMATE:** Coelom absent. Eg. Porifera, coelenterata, platyhelminthes



Earthworm

© E.M. Armstrong 2001

Kingdom Animalia - Definitions

- **PSEDOCOELOMATE**: Cavity called pseudocoelom is present. No lined by mesoderm. It is generally endodermal in origin. Mesoderm occurs but forms small pouches. Eg. Nematoda.
- **COELOMATE**: A true coelom lined by mesoderm is present. Eg. Annelida to vertebrata.
- **BODY SYMMETRY**: Similarity in arrangement of parts.
- Absence of any repetition or similarity - Asymmetry
- Radial Symmetry : The body is cylindrical. Similar parts occur all around the central axis.
- Any vertical plane passing through the central axis will divide the body into two equal halves. Eg. Sponges, Coelenterates, Echinodermites.
- Bilateral Symmetry : The body has a head, limbs are paired. They are arranged laterally. Body is divisible into two equal halves by one plane. Eg. Platyhelminthes, nematoda, annelida, mollusca, arthropoda, Chordata.

KINGDOM: ANIMALIA

PHYLUM: PORIFERA

- They are Organisms with holes, commonly called Sponges.
- **Habitat:** mostly marine except Spongilla(fresh water)
- **Body form:** Sponges are pore bearing animals
Have innumerable pores with canal system
 - OSTIA
 - single large opening (pore) - Osculum
- **Nature:** Non-motile, attached to some solid support and becomes stationary
- **Body System:** Characterized by canal system - circulate water throughout the body to bring in food and Oxygen.
- **Skeleton:** Outer layer covered with exoskeleton made up of either CaCO_3 , silica or protein.

KINGDOM: ANIMALIA

PHYLUM: PORIFERA

- **Organization:** Body involves minimal differentiation
Shows cellular level of organization
Most sponges are *Asymmetrical* while some are radially asymmetrical.
Diploblastic, acoelomate.
Appendages are absent.
- **Digestion:** Intracellular
- **Respiration & Excretion:** By diffusion through general body surface.

Eg. Spongilla, Sycon, Euplectella(Venus flower basket)

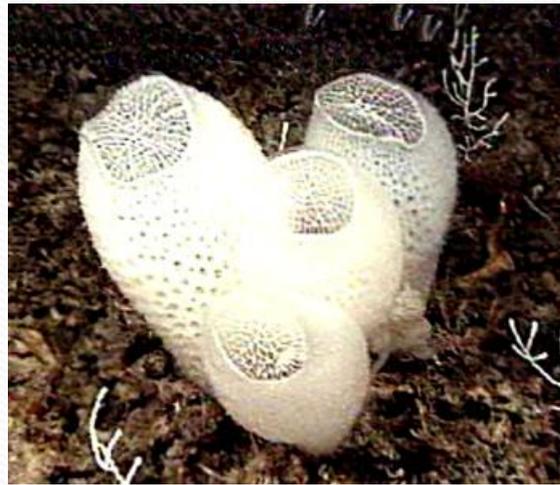
PHYLUM: PORIFERA



Spongilla



Sycon



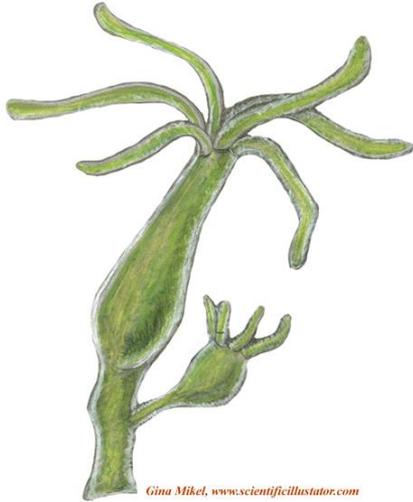
Euplectella

KINGDOM: ANIMALIA

PHYLUM: COELENTERATA (Hollow gut)

- **Habitat:** All are aquatic, Mostly marine except Hydra- fresh water
Some of the species live in colonies Eg. Corals
Some have solitary life span Eg. Hydra
- **Body form:** Shows more body differentiation
Body has a sac like cavity with a single opening for ingestion and egestion of food and waste materials
Diploblastic, radially symmetrical
- **Organisation:** Multicellular, tissue level of organisation with distinctive division of labour.
- **Locomotion :** Through slender finger like projection.
- **Digestion:** Both inter and intra-cellular.
- **Respiration & Excretion:** Through general body surface
- **Nervous System :** Primitive type. Brain is totally absent.
- **Reproduction:** Asexual as well as sexual.
- **Skeleton:** Many forms possess hard exoskeleton of lime to form corals.

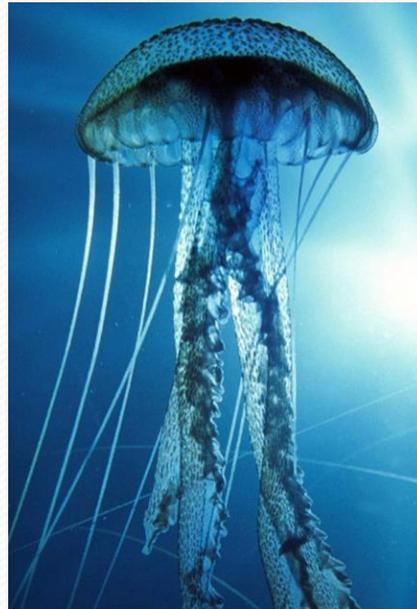
PHYLUM: COELENTERATA



Hydra



Coral



Jellyfish

KINGDOM: ANIMALIA

PHYLUM: PLATYHELMINTHES - Flat worms

- **Habitat:** Mostly parasitic (living in the bodies of other animals)
Eg. Liver fluke
Some are free living Eg. Planaria
- **Germ Layer:** First simple triploblastic from which differentiated tissues and some organs are formed ,
- **Organisation:** organ level of organisation
- **Body Form:** acoelomate - body cavity or coelom is absent to form organs. Bilaterally symmetrical
soft and elongated, dorsiventrally (from top to bottom)
flattened - Flat worms.
- **Respiration & Circulatory organs:** are under developed.
- **Nervous organs:** Are well developed .Primitive brain is formed.
- Eg. Planaria, Liver fluke, Tapeworm.

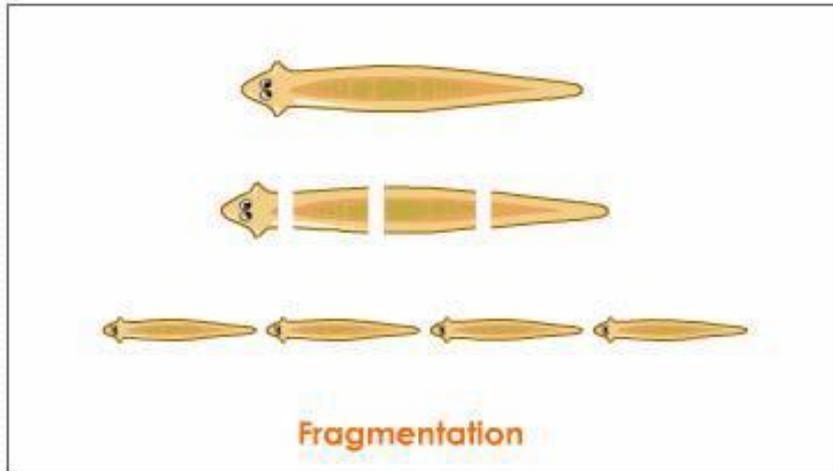
- 
- <http://www.youtube.com/watch?v=woQzSYQGsnA>



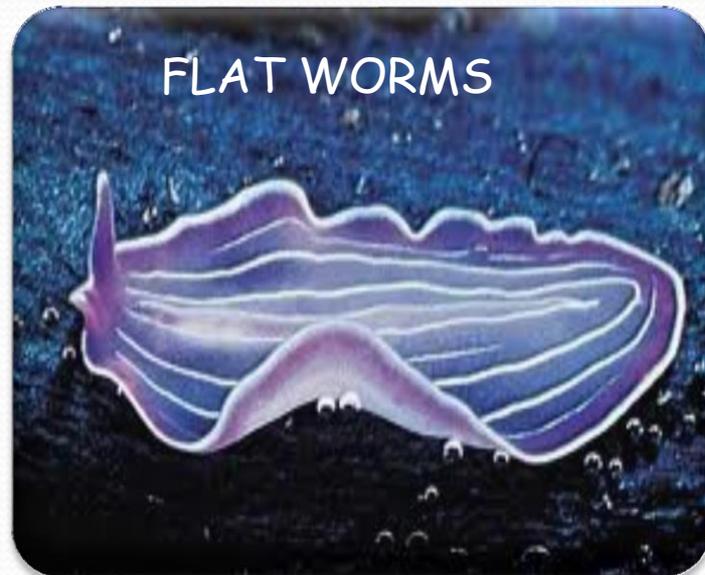
Cestoda



Turbellaria



Fragmentation



KINGDOM: ANIMALIA

PHYLUM: NEMATODA (Thread or Round worms)

- **Habitat:** Parasitic worms causing diseases Eg. Elephantiasis (filarial worms) or worms in the intestine (round worms and pin worms)
- **Germ Layer:** Triploblastic
- **Organisation:** primitive organ system level of organisation . A false cavity or pseudocoelom is present
- **Body Form:** Bilaterally symmetrical, body is narrow, elongated and cylindrical
- **Digestive system:** Has both mouth and anus. First animals to have straight and complete alimentary canal.
- **Nervous and Reproductive system:** Are present
- **Respiratory and Circulatory system:** Are absent.
- Ascaris(round worm), Wuchereria(filarial worm).

FILARIAL WORMS



Hookworms -



*Ancylostoma
caninum*



*Uncinaria
stenocephala*



HOOKWORMS



THREAD WORMS

- 
- <http://www.youtube.com/watch?v=dnWwHthkGkY>

KINGDOM: ANIMALIA

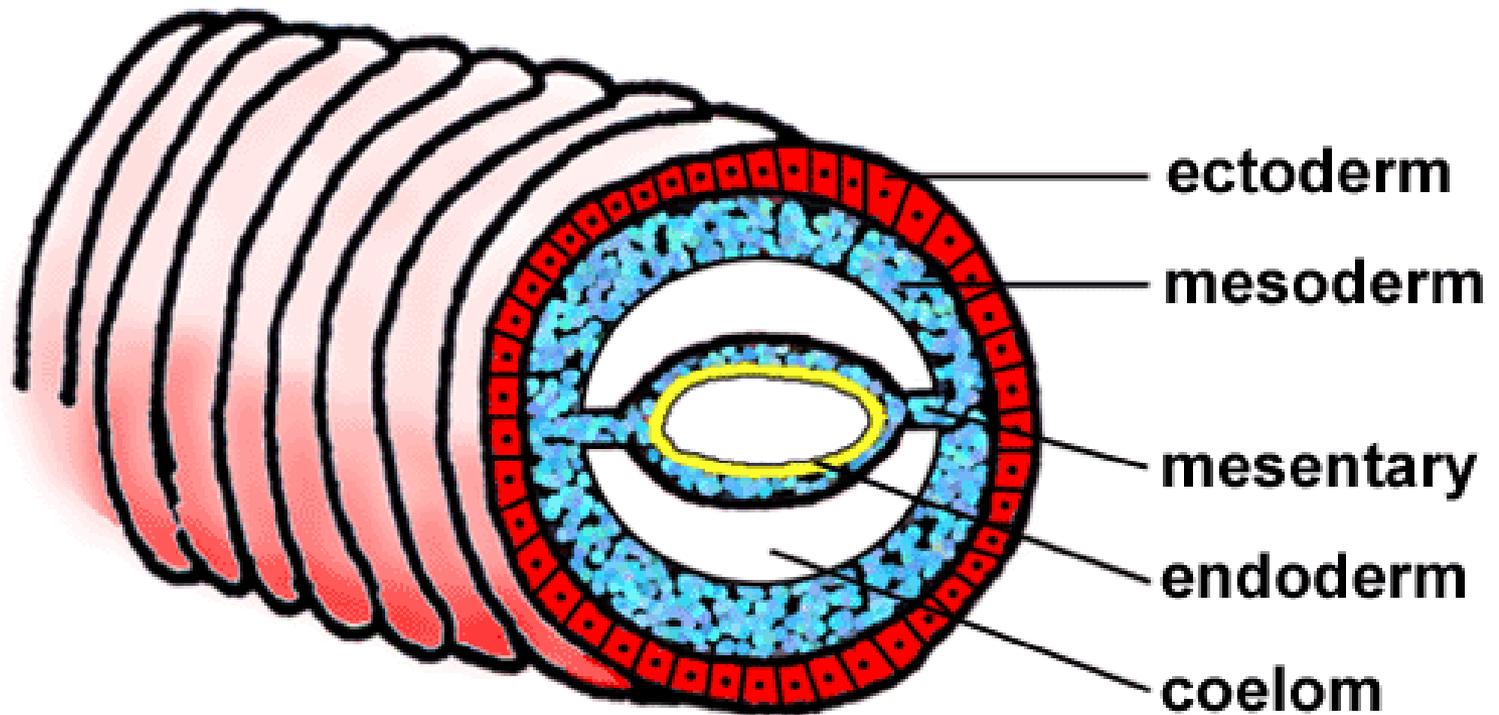
PHYLUM: ANNELIDA (Segmented worms)

- **Habitat:** found in a variety of habitats- fresh water, marine, soil, land.
- Some are parasites- Leech
- **Germ Layer:** Triploblastic
- **Organisation:** organ system level of organisation . A true body cavity or coelom is present.
- **Body Form:** Bilaterally symmetrical, body is elongated, cylindrical and segmented.
- Have metameric segmentation with extensive organ differentiation.
- Segments of the body are lined up one after the other from head to tail.

KINGDOM: ANIMALIA

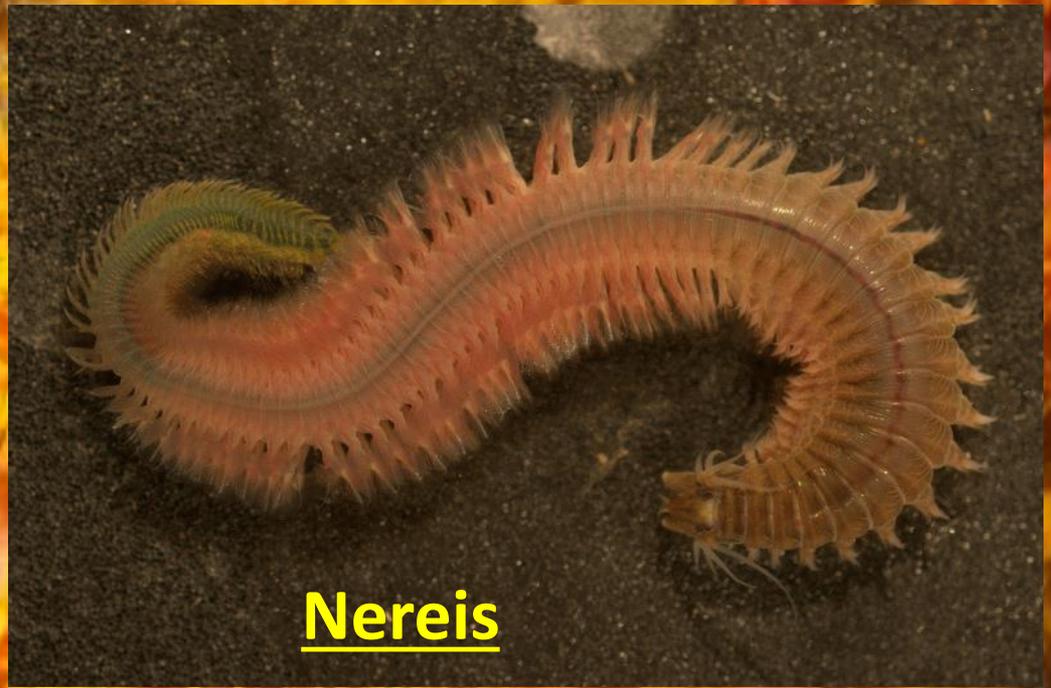
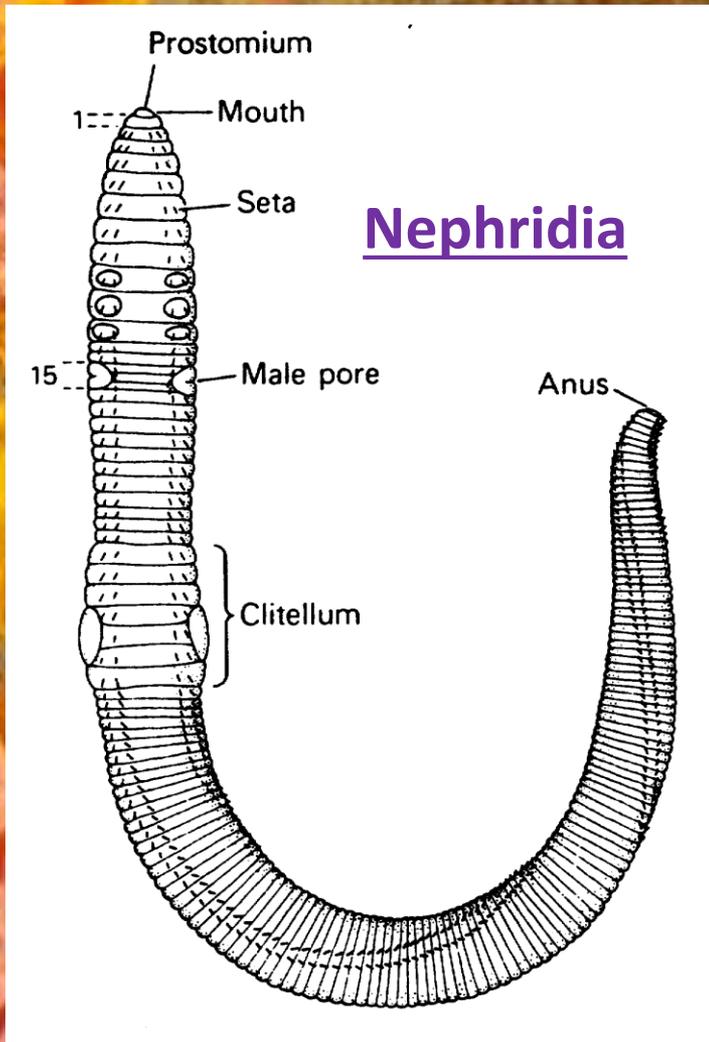
PHYLUM: ANNELIDA (Segmented worms)

- **Digestive system:** Well developed.
- **Circulatory system:** Closed type. ie. Blood flows inside the blood vessels.
- **Excretory system:** has excretory units (nephredia).
- **Nervous and Reproductive system:** Are present
- **Respiratory system:** Respiration is by gills or skin.
- **Locomotion:** By lateral appendages in the form of chitinous setae.
- Eg. Earth worm, leeches, nereis.
- **Definition:** Metameric- external division corresponda to internal divisons.



Earthworm

© E.M. Armstrong 2001





Fireworm





Bristleworm
m



Clamwor
m



Lugworm

- <http://www.youtube.com/watch?v=9820Gjc2oWg>
- <http://www.youtube.com/watch?v=5EXmIMBdQaM>

KINGDOM: ANIMALIA

PHYLUM: ARTHROPODA (Jointed legs)

- **Body Form:**

- Largest group of animals.
- Have segmented body divided into head, thorax and abdomen.
- Have three or more pairs of jointed legs.
- Have a pair of compound eye on the head.
- Body is covered by hard exoskeleton made of chitin.
- Coelomic cavity is blood-filled - haemocoel

- **Germ Layer:** Bilaterally symmetrical, triploblastic and segmented.

- **Habitat:** found everywhere on Earth - land, soil, water and as parasites on plants and animals.

KINGDOM: ANIMALIA

PHYLUM: ARTHROPODA (Jointed legs)

- **Circulatory system:** Open circulatory system - blood does not flow in well-defined blood vessels.
- **Respiratory system:** By general body surface, gills or trachea.
- **Excretory system:** By tubules (malpighian tubules)
- **Organisation:** organ system level of organisation .
- Eg. Prawns, butterflies, house flies, spiders, scorpions, crabs, cockroaches, silk moths, centipedes, honey bees, mosquitoes, etc.

KINGDOM: ANIMALIA

PHYLUM: ARTHROPODA (Jointed legs)



tarantula



Popular Species - Info, Specimens & More



Arachnids



Beetles



Butterflies



Cicada



Dragonflies



Grasshoppers



Walking Sticks



Moths

<http://www.youtube.com/watch?v=-jNNvjJkLoc>

KINGDOM: ANIMALIA

PHYLUM: MOLLUSCA (Soft bodied animals)

- **Body Form:** Coelomic cavity is reduced and filled with blood
- **Germ Layer:** Bilaterally symmetrical, triploblastic and little or no segmentation.
- **Habitat:** mostly aquatic. majority are marine. some occur in fresh water and some are terrestrial.
- **Skeleton:** Soft body is supported by hard shell made up of Calcium Carbonate
- **Locomotion:** Is by muscular foot.

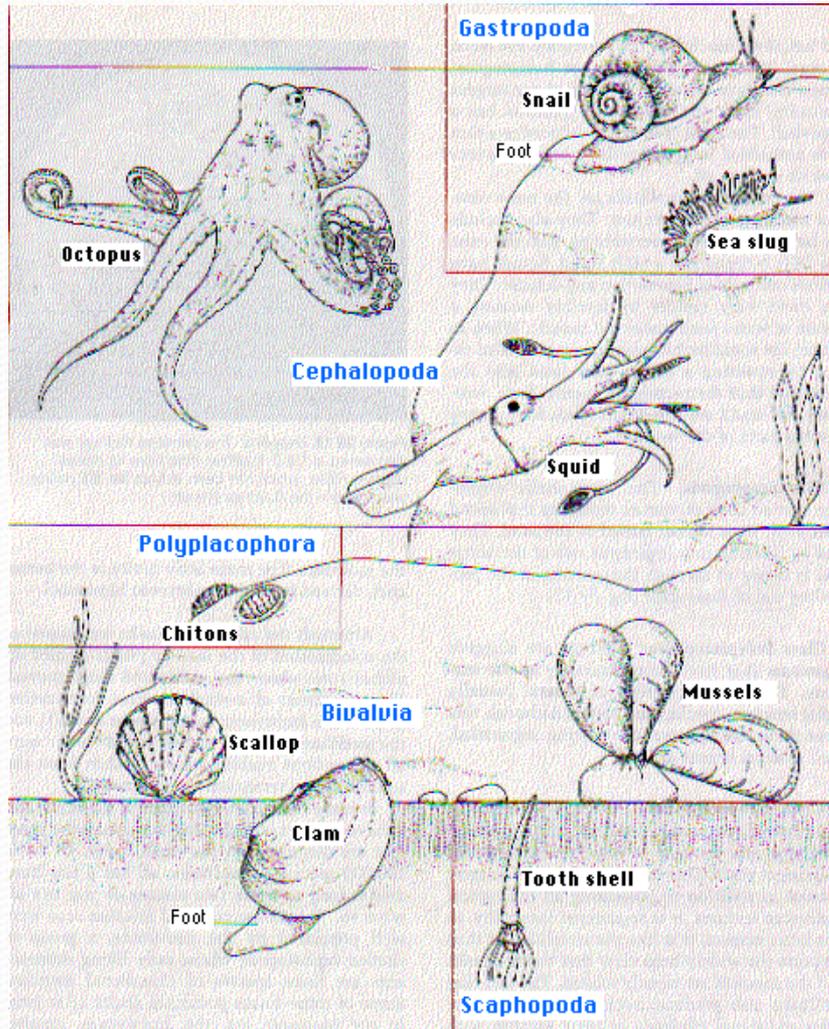
KINGDOM: ANIMALIA

PHYLUM: MOLLUSCA (Soft bodied animals)

- **Circulatory system:** Open circulatory system
- **Respiratory system:** By gills, skin, pulmonary sac (lungs).
- **Excretory system:** Kidney like organs are present
- **Organisation:** organ system level of organisation .
- **Sense organs:** Eyes and tentacles are present on the head. Balancing and tasting organs are well developed.
- Eg. Chiton, octopus, pila, unio

KINGDOM: ANIMALIA

PHYLUM: MOLLUSCA (Soft bodied animals)



KINGDOM: ANIMALIA

PHYLUM: MOLLUSCA (Soft bodied animals)





http://www.youtube.com/watch?v=jsxAr_yrJtM

KINGDOM: ANIMALIA

PHYLUM: ECHINODERMATA (Spiny skinned animals)

- In Greek: Echino - hedgehog
- **Body Cavity:** Coelomic cavity has a peculiar water driven tube system used for locomotion with tube feet, collection of food and aids in respiration - called water vascular system.
- **Germ Layer:** Triploblastic
- **Habitat:** Exclusively free living, marine animals.
- **Skeleton:**
 - Have hard calcium carbonate structure, which they use as skeleton.
 - An exoskeleton of movable, rigid spines occurs on the outside.
- **Symmetry:** Radial symmetry in adults. Bilateral symmetry in larvae stage.

KINGDOM: ANIMALIA

PHYLUM: ECHINODERMATA (Spiny skinned animals)

- **Body Form:** No head or tail. No right or left side.
- **Locomotion:** Under surface of the body bears number of microscopic appendages called tube feet for locomotion.
- **Organisation:** organ system level of organisation .
- Eg. Antedon (feather star), holothuria (sea cucumber), asterias (starfish), echinus (sea urchin)

KINGDOM: ANIMALIA

PHYLUM: ECHINODERMATA (Spiny skinned animals)



Sunflower Starfish



Echinus

KINGDOM: ANIMALIA

PHYLUM: ECHINODERMATA (Spiny skinned animals)



Antedon



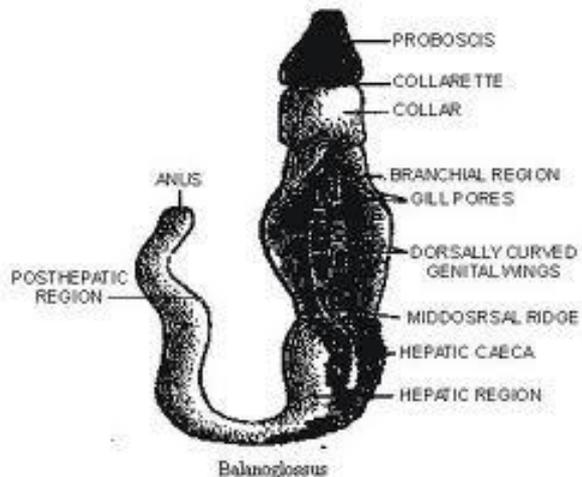
Holothuria

- 
- http://www.bbc.co.uk/nature/life/Sunflower_starfish#p005bpt2
 - <http://www.youtube.com/watch?v=D3W4OCnHyCs&feature=related>

KINGDOM: ANIMALIA

PHYLUM:PROTOCHORDATA

- Nonvertebrate chordate
- Do not possess brain, cranium, vertebral column, jaws and paired appendages.
- **Habitat:** Marine, soft worm like animals
- **Germ Layer:** Triploblastic
- **Body Form:** Bilaterally symmetrical, body is divisible into Proboscis, collar and trunk
- **Organization:** organ system level of organization .
- **Excretory and Circulatory system:** Are well developed.



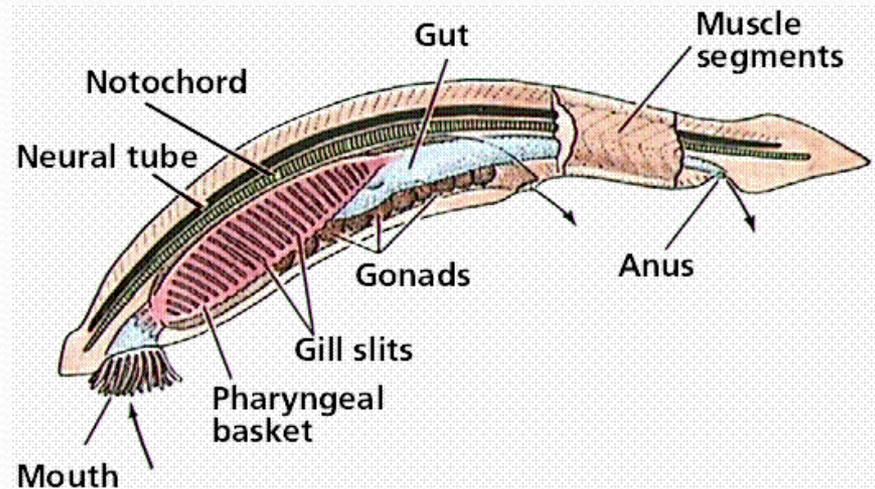
KINGDOM: ANIMALIA

PHYLUM:PROTOCHORDATA

Notochord:

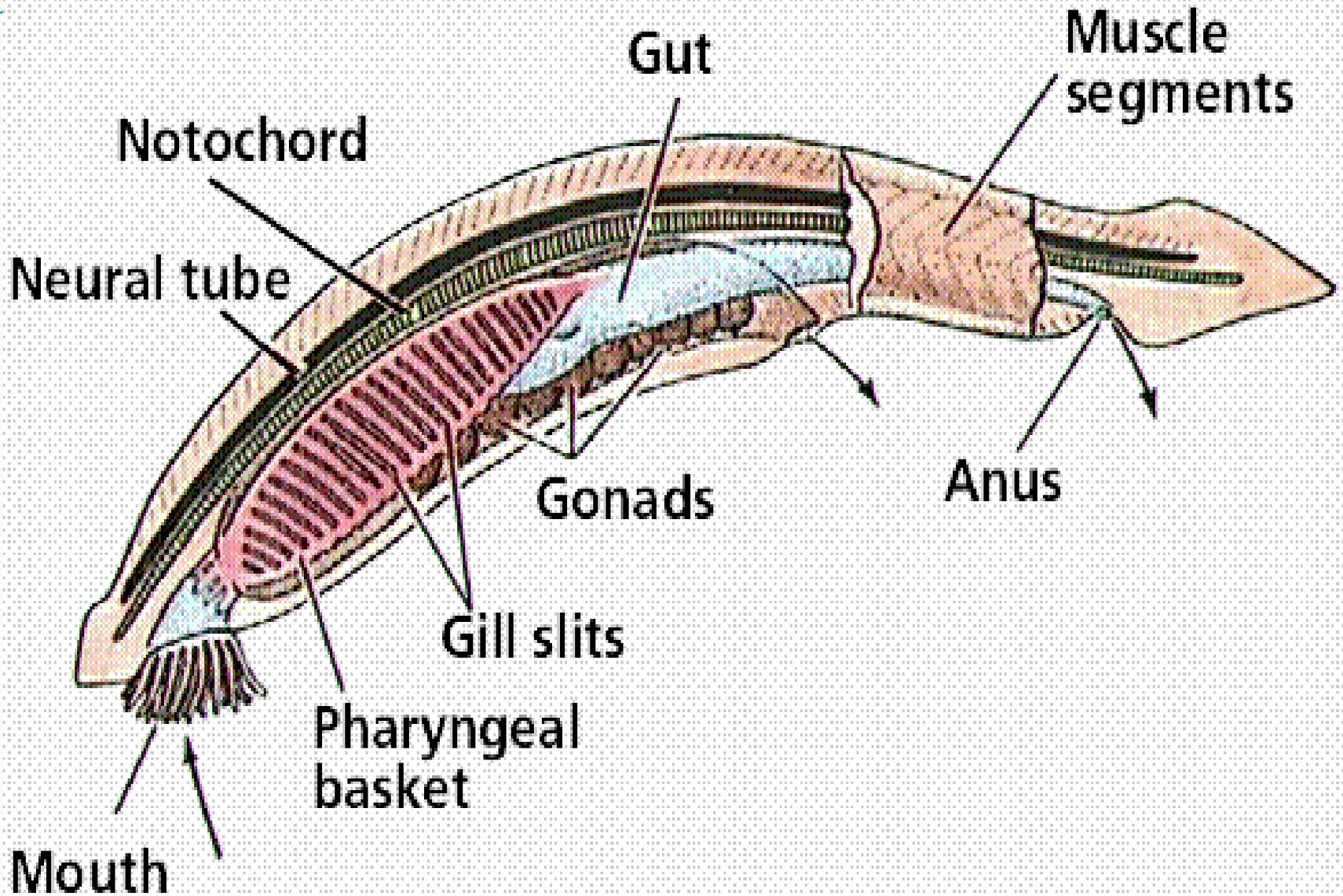
- A rod like support structure is present at some stage of life.
- run along the dorsal side of the animal
- separates the nervous tissue from the gut
- functions as a supportive structure by providing points for attachment of muscles.
- Notochord may not be present at all stages or the entire length of the animal.

Eg. Balanoglossus , Herdmania,
Amphioxus



KINGDOM: ANIMALIA

PHYLUM:PROTOCHORDATA



KINGDOM: ANIMALIA

PHYLUM:PROTOCHORDATA

Notochord:

- Characteristic of chordates, a stiff rod of tissue along the back of the body which is the first stage in the development of a flexible internal skeleton.
- All chordates possess a notochord at sometime during their lives.
- replaced by cartilage or bone in the adult vertebrate and absent in the adults of other chordate groups.

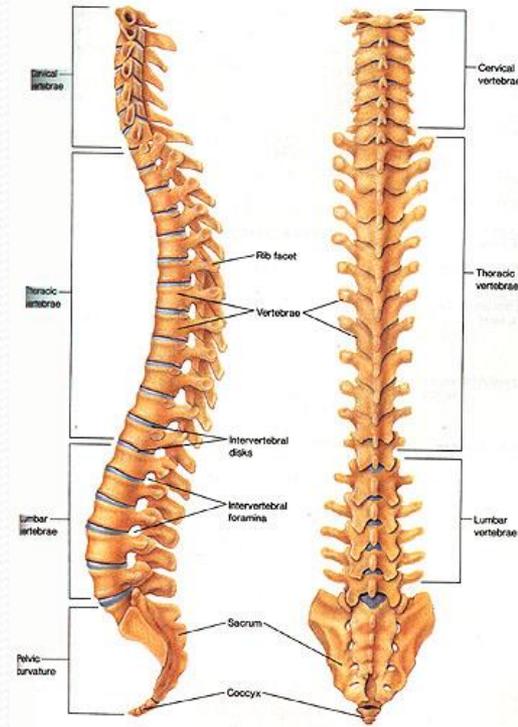


<http://www.youtube.com/watch?v=QFID9WXZFPY>

KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

- Most advanced group of animals.
- Have true vertebral column
- Notochord is present in the embryonic stage later replaced by an endoskeleton of vertebral column
- Dorsal nerve - transformed into brain and spinal cord
- Bilaterally symmetrical, triploblastic, coelomate
- Segmented with complex differentiation of body tissues and organs
- Respiration is by gills in aquatic animals and by lungs in land animals



All chordates possess

- A notochord
- A dorsal nerve cord
- Pair of gilled pouches
- Triploblastic
- coelomate



Vertebrates are grouped into 5 classes

1. Pisces
2. Amphibians
3. Reptiles
4. Aves
5. Mammalia

KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : PISCES

- Fishes, aquatic animals
- Body covered with scales/ plates
- Streamlined body
- Fins are present but limbs are absent
- Muscular tail helps in movement
- Respiration - through gills
- Cold blooded and have two chambered heart
- Lay eggs except shark
- Have lateral line sense organs along the body - specialized to receive vibrations in water

KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : PISCES

- Based on their skeleton there are two types of fishes

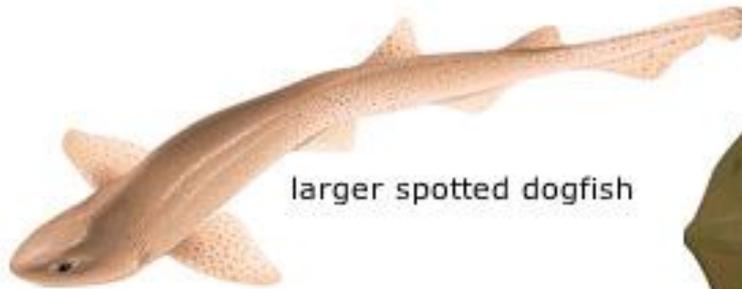
1. Cartilaginous fish

- endoskeleton is made up of cartilage, air bladder is absent.
- mostly marine, large in size
- body is laterally compressed, spindle shaped or dorsiventrally flattened and disc shaped
- Eg. Shark, rays

2. Bony fish

- endoskeleton is made up of bones,
- air bladder is present gives buoyancy
- Fresh water and sea water
- Spindle shaped
- Eg. Rohu, Catla, Hilsa, Exocoetus, Seahorse, etc.

CARTLAGENOUS FISH



larger spotted dogfish



skate



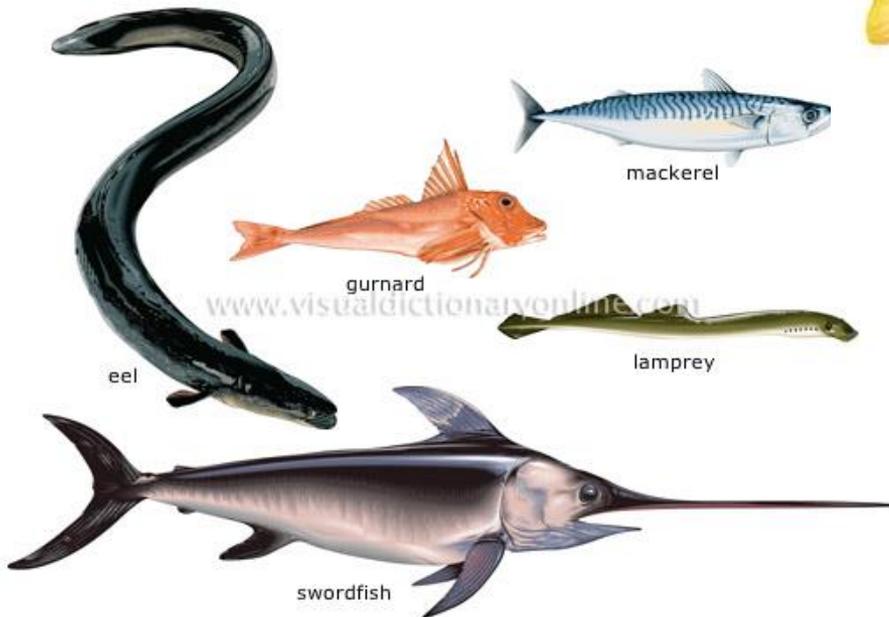
smooth hound



sturgeon

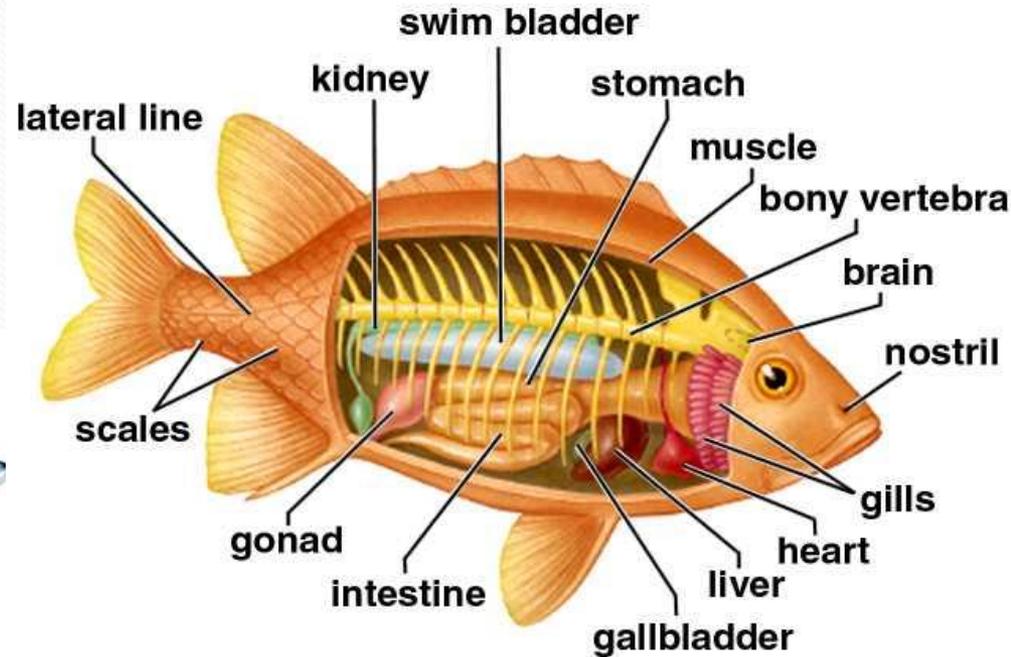
www.visualdictionaryonline.com

BONY FISH



Copyright © The McGraw-Hill Companies, Inc. Permission required for reproduction or display.

Ray-finned fishes



KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : AMPHIBIA

- Lives in water and on land
- Body skin is smooth with mucous that keeps the skin moist
- No scales
- Breathe through gills, skin or lungs
- Cold blooded, have three chambered heart
- Have pentadactyl (5 divisions) limbs without claws
- Lay eggs in water. They are aquatic in larva stage, They require water for completion of their life cycle.
- Head and trunk are distinct, neck and tail may or may not be present.
- Eg. Frogs, toads, Salamander, hyla(tree frog)



salamander



adhesive disk

tree frog



common toad



newt

www.visualdictionaryonline.com

KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : REPTILES

- Terrestrial , creeping animals living in warmer region, burrows
- Body skin is covered with scales
- Cold blooded, have three chambered heart except crocodile -4 chambered heart
- Skin is dry, rough, without mucous glands
- Body is divided into head, neck and trunk.
- Tail may be present in some and in some it is reduced.
- Respire through lungs
- Have two pairs of pentadactyl limbs. Absent in snakes
- Lay eggs with hard covering on land.
- Eg. Lizards, Snakes, Crocodils, Tortoise

turtles
tortoises



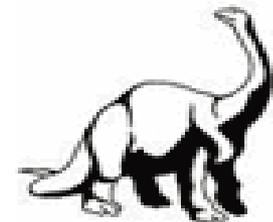
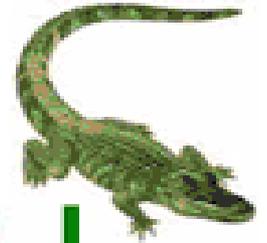
plesiosaurs
ichthyosaurs



mammals



all other reptiles
birds



anapsid



eurypsids



synapsid



diapsid



most primitive
reptile



KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : AVES

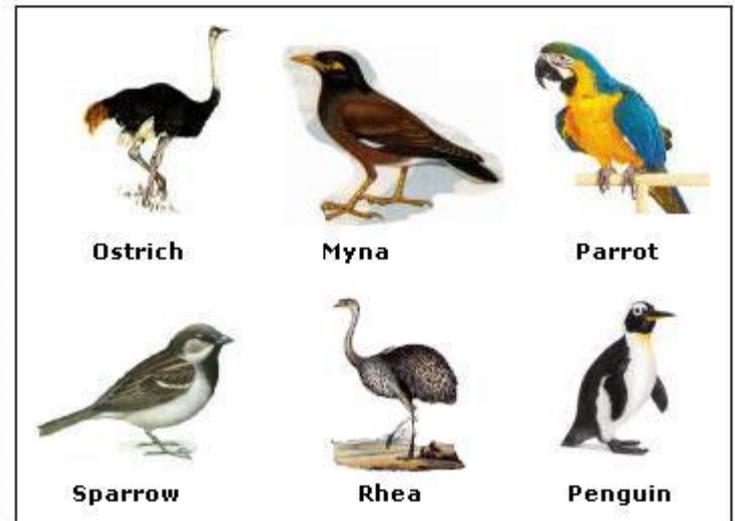
- Terrestrial , flying animals
- Body skin is covered with scales
- Warm blooded, 4 chambered heart
- Lay eggs and are called oviparous.
- Have keen sense of sight. Sense of smell is poorly developed.
- Body is divided into head, neck and trunk and tail.
- Body covered with a feathery exoskeleton
- Endoskeleton- bony and cartilaginous supporting structure, provides support from within.

KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : AVES

- Respiratory system is well developed. Respire through lungs
- Two fore limbs modified into wings for flight, hind limbs have four clawed digits.
- Endoskeleton is light with bones having air cavities.
- Jaws are modified into strong beaks. Teeth are absent.
- Larynx is absent. Sound is produced by special organ - SYRINX
- Eg. Ostrich, Pigeon, Sparrow, Crow, etc.



KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : MAMMALIA

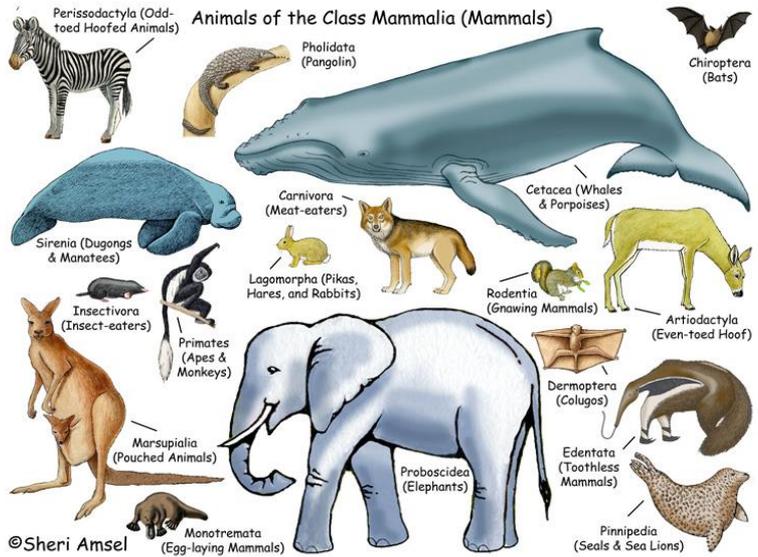
- Found in diverse habitat - desert, polar icecaps, oceans, mountains, forests and grasslands.
- Warm blooded, four chambered heart.
- Have mammary glands for the production of milk to nourish the young ones.
- Skin has sweat and oil glands.
- Give birth to young ones and feed them. So called as viviparous.
- Mammals like Platypus, and Echidna lay eggs and some like Kangaroos give birth to very poorly developed young ones.

KINGDOM: ANIMALIA

PHYLUM: VERTEBRATA

CLASS : MAMMALIA

- Have two pairs of limbs with five fingers
- Eyes are provided with movable lids.
- Ears are fleshy and have Pinnae (external ear).
- Have two sets of teeth - milk teeth and permanent teeth which are different types.
- Breathe through lungs.
- Eg. Humans, Bats, Whale, Rat, Cat, etc.





Platypus



Echidna



Kangaroo



Echidna Baby



NOMENCLATURE

1. Giving scientific names to plants and animals.
2. Name of every organism is composed of two components - a) Genus (b) Species (specific)
3. This kind of naming - Binomial nomenclature
Eg. Humans - *Homo sapiens*
4. Binomial nomenclature is guided by a set of rules stated in the *International code of Binomial Nomenclature*
5. Binomial nomenclature - proposed by *Carolus Linnaeus*

NOMENCLATURE

Conventions for scientific names:

1. Genus - Capital letter
2. Species - small letter
3. When printed - *Italics*
4. Hand written - Genus and species should be underlined separately Eg. Homo sapiens

Scientific names:

- i. Peacock - Pavo cristatus
- ii. Mango - Magnifera indica
- iii. Ant - Solenopsis invicta
- iv. Neem - Azadirachta indica

NOMENCLATURE

Scientific names:

H.W

- i. Pea -
- ii. Tiger -
- iii. Potato-
- iv. Lotus -
- v. Earth worm -
- vi. House fly -



THANK YOU