SCIENCE -IX

(BIOLOGY)

Specimen Copy

2022-23

Lesson	Topic	
5	The Fundamental Unit of life	
6	Tissue	
7	Diversity in Living Organisms	

Chapter - 6

Tissues

1. **Tissue** is a group of cells having similar origin, structure & function. Study of tissues is called **Histology**

2. In unicellular organism (Amoeba), single cell performs all basic functions, whereas in multi-cellular organisms (Plants and Animals) shows division of labour as Plant tissue & Animal tissues.

3. Plant tissues are two types: Meristematic & Permanent tissues.

4. **Meristems:** The Meristems are the tissues having the power of cell division. It is found on those region of the plant which grows.

Types of Meristems;

1. **The Apical meristems** – It is present at the growing tip of the stem and roots and increases the length.

2. **The lateral meristems** - present at the lateral side of stem anf root (cambium) and increases the girth.

3. **The intercalary meristems - present** at internodes or base of the leaves and increases the length between the nodes.

Permanent tissues: Two types such as Simple permanent tissues & Complex permanent tissues.

a) **Simple permanent tissues**: subdivided as

(i): **Parenchyma:** Tissues provide the support to plants.They are loosly packed and has large intracellular space.

- Parenchyma with chlorophyll which performs photosynthesis is called as

chlorenchyma.

- The parenchyma with large air spaces to give buoyancy is called as aerenchyma.

Parenchyma also stores food and water.

(ii) **Collenchyma**: Tissue provides mechanical support, thickened at the corners, have very little intercellular space. It allows easy bending of various parts of a plants without breaking

(iii) **Sclerenchyma:** Tissue makes the plant hard and stiff, thickened due to lignin and no intercellular space. Cells of this tissue are dead and commonly seen in the husk of coconut.

(iv) **Guard cells& Epidermal tissue**: the tissue aids in protection and exchange of gases.

Guard cells are kidney shaped in dicots, dumb bell shaped in monocots to guard the stomata. The epidermal tissues of roots aid in absorption of water and minerals. The epidermal tissues in desert plants have a thick waxy coating of Cutin with waterproof quality. The epidermal tissues form the several layer thick Cork or the Bark of the tree.

b) Complex permanent tissues: The complex tissues are made of more than one type

of cells. All these cells coordinate to perform a common function. They are subdivided as;

Xylem: It consists of tracheids, vessels, xylem parenchyma and xylem fibers. The cells have thick walls,

Function - help in conduction of water and minerals.

Phloem: It consists of sieve tubes, companion cells, phloem parenchyma, and phloem fibers.

Function:- Phloem transports food material to other parts of the plants.

6. **Animal tissues**: Sub divided as epithelial tissue, connective tissue, muscular tissue and nervous tissue.

1. **Epithelial tissue**: It is a protective covering forming a continuous sheet. Simple epithelium is the one which is extremely thin in one layer, whereas stratified epithelium are arranged in pattern of layers.

Depending on shape and function they are classified as:

a) **Squamous epithelium** in the lining of mouth and esophagus.

b) **Cuboidal epithelium** in the lining of kidney tubules and salivary glands.

c) **Columnar epithelium** in the intestine &Columnar epithelium with cilia in the lining of respiratory tract.

d) **Glandular epithelium** in the Glands aids in a special function as gland cells, which can secrete at the epithelial surface.

ii**) Connective Tissue**:

a**) Blood:** The Blood is a fluid connective tissue. Blood plasma has RBCs (Red Blood Cells) WBCs (White Blood Cells) and platelets. Blood plasma contains proteins, salts and hormones. Blood flows and transports gases, digested food, hormones and waste materials.

b**) Bone**: The bone is a connective tissue with hard matrix, composed of calcium and phosphorus. A bone is connected by another bone with another connective tissue called ligaments. A bone is connected by muscle with another connective tissue called tendon.

c) Cartilage: The cartilage is a connective tissue with solid matrix composed of proteins and sugars. It is commonly seen in nose, ear, trachea, and larynx.

d) Areolar Connective Tissue: It is found between the skin and muscles, around the blood vessels. It supports internal organs and aids in repair of tissues.

e)Adipose Connective Tissue: It is filled with fat globules for the storage of fat. It acts as insulator.

Muscular tissues: They have special contractile proteins responsible for movements. Three types, such as;

Striated muscles/skeletal muscles/voluntary muscles :

They are cylindrical, un-branched and multinucleated. They have dark bands and light bands.

Unstriated muscles /smooth muscles/involuntary muscles:

They are commonly called as Smooth muscles, having no striations (dark bands/ light bands are absent). Commonly found alimentary canal, uterus, Iris of an Eye. They are spindle shaped. Involuntary in nature.

Cardiac Muscles: They are commonly called as Heart muscles, cylindrical, branched and uni-nucleate. Involuntary in nature .

Nervous Tissue: The tissue responds to stimuli. The brain, spinal cord and nerves are composed of nervous tissue or neurons. A neuron consists of Cell Body, cytoplasm, Nucleus, Dendrite, Axon, nerve ending. The neuron impulse allow us to move our muscles when we want to respond to stimuli.**(Page No. 69)**

1. What is tissue?

Ans. It is a group of cells similar in origin and structure and they are specialized to perform a particular function like muscle cells in our body forms the muscle tissue that bring about body movements (specific function).

2. What is the utility of tissues in multi-cellular organisms?

Ans. There is a clear cut division of labour in multicellular organisms i.e. different parts of the body of a multicellular organism perform specific functions. For example, brain controls all other parts of body, heart pumps blood to all parts of body, kidneys remove waste materials from body, sense organs collect information from external sources for sensory perception etc. All these functions would never be possible without formation of tissues in multicellular organisms.

(Page No. 74)

1. Name types of simple tissues.

Ans. The simple tissues (found in plants) are of following three types:

i) parenchyma **ii)**
collenchyma **iii)**
Sclerenchyma

2. Where is apical meristem found?

Ans. The apical meristem is found at the apex (growing tips) of the stem and roots.

3. Which tissue makes up the husk of coconut?

Ans. Sclerenchymatous fibres

4. What are the constituents of phloem?

Ans. The constituents of phloem are: sieve tubes, companion cells, phloem parenchyma, phloem fibres (bast).

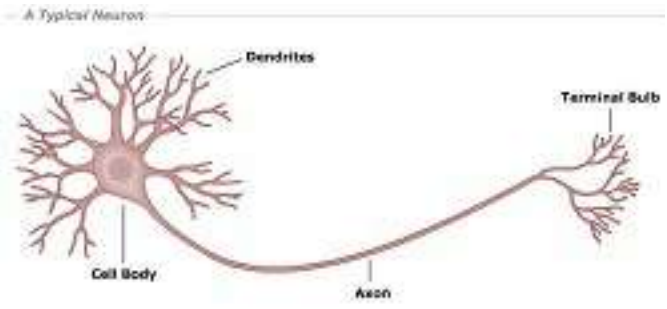
(Page No. 78)

1. Name the tissue responsible for movement in our body.

Ans. Muscle/muscular tissue.

2. What does a neuron look like?

Ans. A neuron comprises of a cell body (cyton) along with one or more short branches(Dendron) and one hair like long branch (axon).



3. Give three features of cardiac muscles.

Ans. (i) Cardiac muscles are involuntary i.e. they don't work under our will.
(ii) Its cells are cylindrical, branched, striated and uninucleate.
(iii) It shows rhythmic contraction and relaxation throughout the person's life.

4. What are the functions of areolar tissue?

Ans. Areolar tissue is a kind of filler tissue found between skin and muscles, around our blood vessels and nerve cells and also in the bone marrow. Its functions are therefore

i) To fill the space inside organs.

ii) To help in repair and maintenance of nearby tissues/organs.

iii) To support and prevent injuries to internal organs.

Chapter – end

1. Define the term "tissue".

Ans. It is a group of cells similar in origin and structure and they are specialized to perform a particular function like muscle cells in our body forms the muscle tissue that brings about body movements(specific function).

2. How many types of elements together make up the xylem tissue? Name them.

Ans. Xylem tissue is made up of following 4 types of elements:

i) Tracheids

ii) vessels

iii) Xylem fibres

iv) Xylem parenchyma

3. How are simple tissues different from complex tissues in plants?

Ans.

Simple tissue	Complex tissue
i) It is made up of only one type of cells. ii) All cells of this tissue work as individual units to perform a particular function. Eg. parenchyma, collenchyma and sclerenchyma tissues.	i) It is made up of more than one type of cells. ii) Cells of this tissue work together as one single unit to bring about a particular function. Eg. xylem and phloem tissues.

4. Differentiate between parenchyma, collenchyma and sclerenchyma on the basis of their cell wall.

Ans.

Parenchyma	Collenchyma	Sclerenchyma
Cell wall is thin and made up of cellulose.	Cell wall is irregularly thickened at corners due to deposition of pectin.	Cell wall is very thick due to deposition of impermeable substance lignin.

5. What are the functions of the stomata?

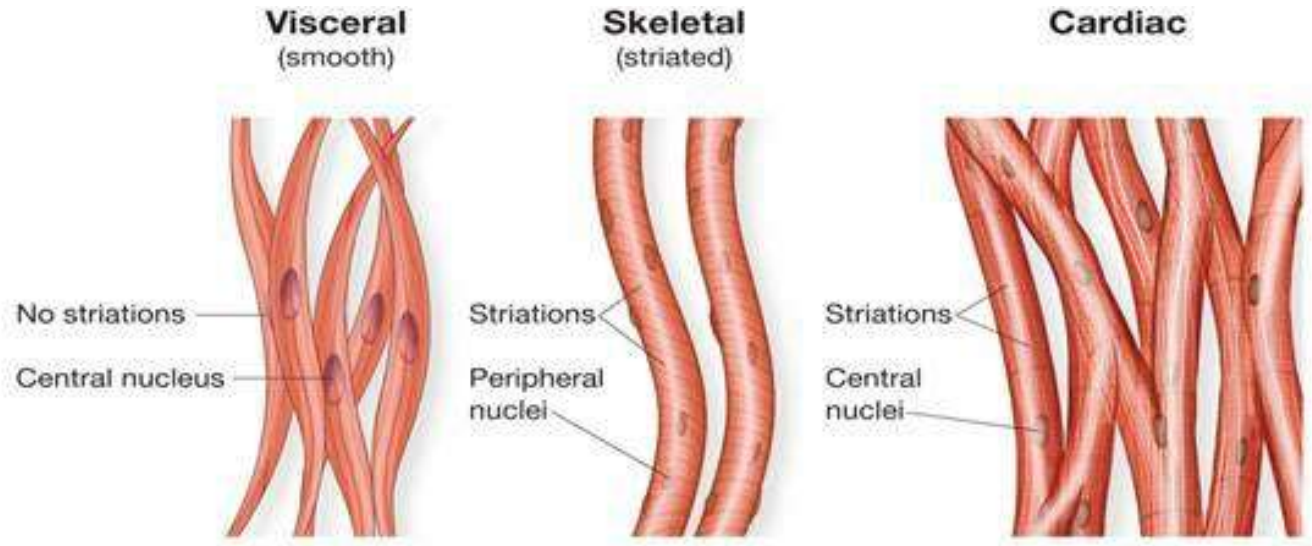
Ans. The functions of stomata are:

i) gaseous exchange like exchange of CO_2 and O_2.

ii) Process of transpiration i.e. loss of excess water in the form of water vapour occurs through stomata.

6. Diagrammatically show the difference between the three types of muscle fibres.

Ans.



Contracts	Slowly	Rapidly	Rapidly
Found	Viscera, blood vessels	Trunk, extremities, head and neck	Heart
Control	Involuntary	Voluntary	Involuntary

7. What is the specific function of the cardiac muscle?

Ans. Cardiac muscles are the muscles of heart that pumps blood to all parts of body and the pumping needs rhythmic contraction and relaxation of cardiac muscles throughout the life

without any fatigue.

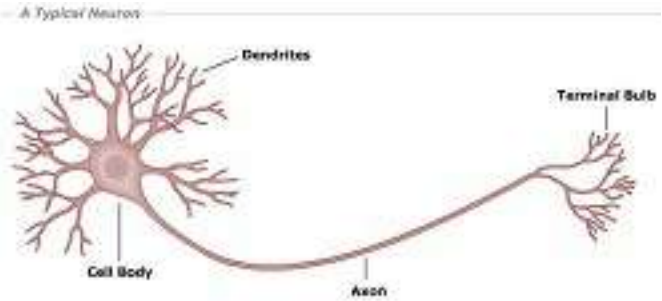
8. Differentiate between striated, unstriated and cardiac muscles on the basis of their structure and site/location in the body.

Ans.

Striated muscle	Unstriated muscle	Cardiac muscle
They show light and dark bands (striations) when we stain them. Their cells are elongated and cylindrical also unbranched. Cells are multinucleate.	They don't show any striations on staining. Their cells are long but spindle shaped and unbranched. Cells are uninucleate.	They show striations on staining. Their cells re cylindrical and branched. Cells are uninucleate.
They are responsible to bring about voluntary movements (like tongue, limbs etc)	They are involuntary in action (walls of tubular organs, blood vessels etc)	They are again involuntary in their function (contraction and relaxation of heart)

9. Draw a labelled diagram of a neuron.

Ans.



10. Name the following.

(a) Tissue that forms the inner lining of our mouth.

(b) Tissue that connects muscle to bone in humans.

(c) Tissue that transports food in plants.

(d) Tissue that stores fat in our body.

(e) Connective tissue with a fluid matrix.

Ans. (a) epithelial tissue

(b) tendons

(c) phloem

(d) adipose tissue

(e) blood

(f) nerve tissue

11. Identify the type of tissue in the following: skin, bark of tree, bone, lining of kidney tubule, vascular bundle.

Ans.

Skin	Epithelial tissue
Bark of tree	Sclerenchymatous tissue
Bone	Connective tissue
Lining of kidney tubule	Cuboidal epithelial tissue
Vascular bundle	Complex permanent tissue

12. Name the regions in which parenchyma tissue is present.

Ans. Parenchymatous tissue is present in the epidermis, cortex, pith of the stem, root, leaves, flowers and fruits of plants.

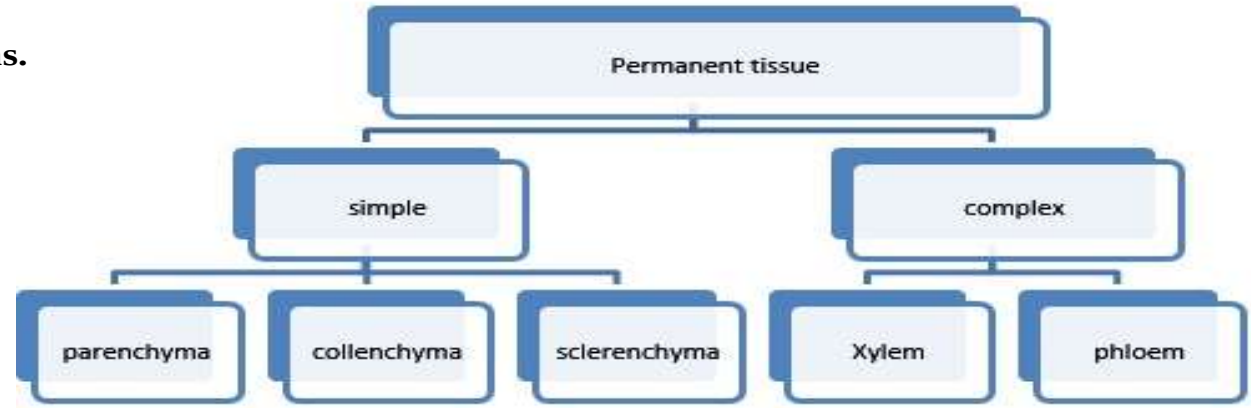
13. What is the role of epidermis in plants?

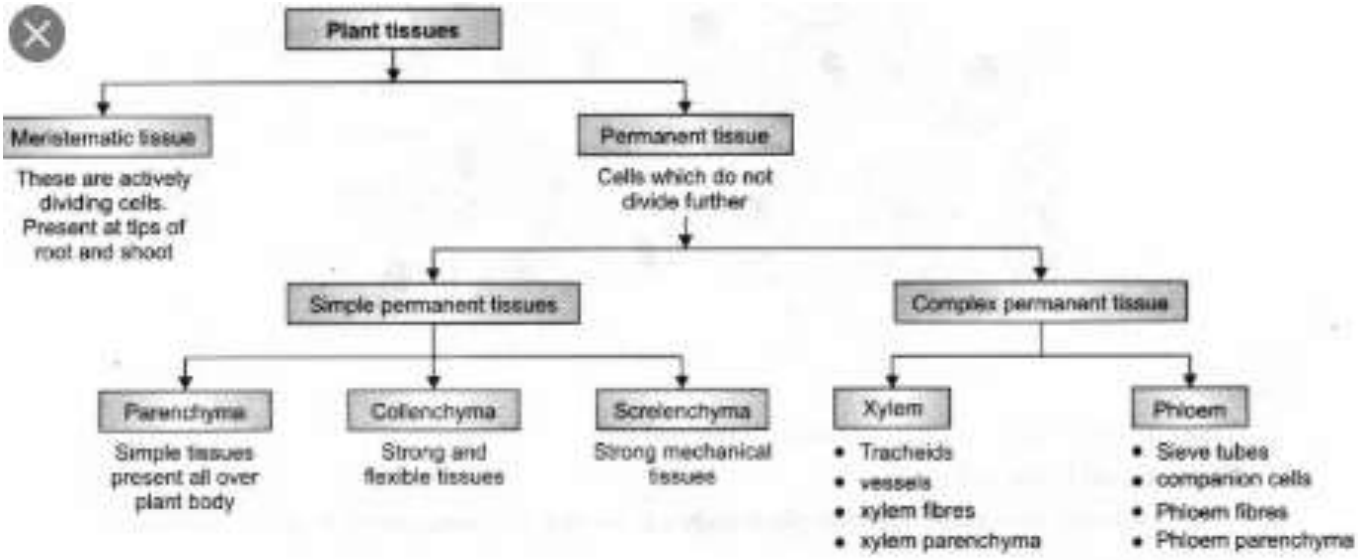
Ans. It is a protective layer to the plant parts. It can also absorb water from soil like in the roots and even allow exchange of gases through stomata. It also helps in preventing the entry of pathogens.

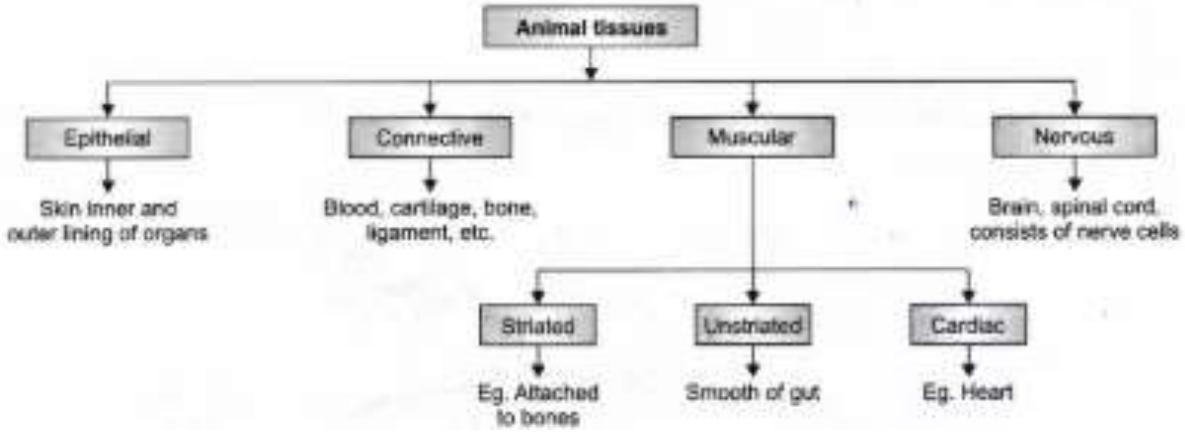
Ans. In plants the secondary meristem cuts off many external layers of cells that are dead and arranged in a compact manner. Such layers together make cork. They have deposition of suberin which is very hard and impermeable hence protects plants from unfavorable conditions and microbial attack etc.

15. Complete the table:

Ans.







Short Answer Questions

34. Animals of colder regions and fishes of cold water have thicker layer of subcutaneous fat. Describe why?

Ans. Fat acts as subcutaneous insulation of body for thermoregulation. The animals living in cold regions have various layers of fat so that the temperature of the body can be maintained and also because fats do not allow the internal heat to escape out of the body.

35. Match the column (A) with the column (B)

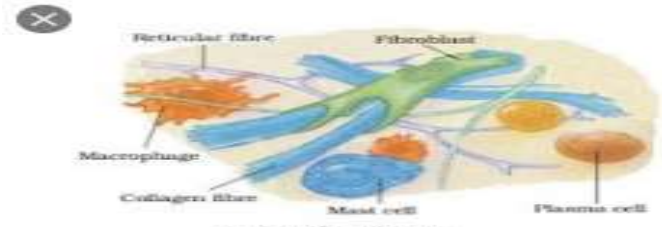
Column (A)	Column (B)
(a) Fluid connective tissue	(i) Subcutaneous layer
(b) Filling of space inside the organs	(ii) Cartilage
(c) Striated muscle	(iii) Skeletal muscle
(d) Adipose tissue	(iv) Areolar tissue
(e) Surface of joints	(v) Blood
(f) Stratified squamous epithelium	(vi) Skin

Ans. a—(v); b—(iv); c—(iii); d—(i); e—(ii); f—(vi);

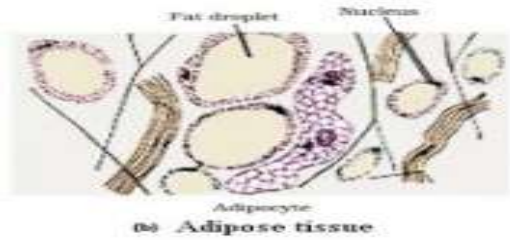
36. Match the column (A) with the column (B)

Column A	Column B
(a) Parenchyma	(i) Thin walled, packing cells
(b) Photosynthesis	(ii) Carbon fixation
(c) Aerenchyma	(iii) Localized thickenings
(d) Collenchyma	(iv) Buoyancy
(e) Permanent tissue	(v) Sclerenchyma

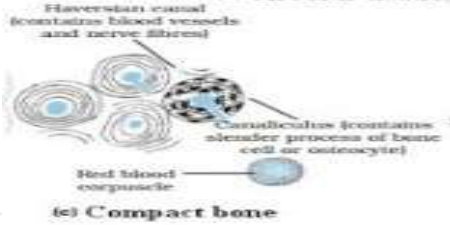
Ans. a—(i); b—(ii); c—(iv); d—(iii); e—(v);



(a) Areolar tissue

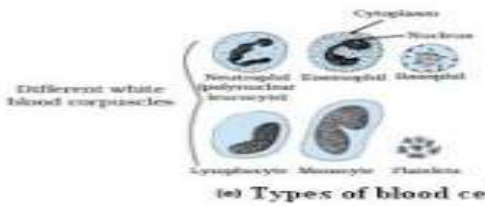


(b) Adipose tissue



(c) Compact bone

(d) Hyaline cartilage



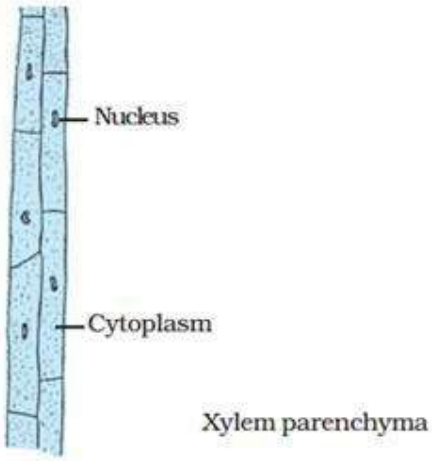
(e) Types of blood cells

37. If a potted plant is covered with a glass jar, water vapours appear on the wall of glass jar. Explain why?

Ans. Transpiration takes place through stomata. Water vapour comes out of leaves during transpiration. When a potted plant is covered with a glass jar, water vapour (coming out because of transpiration) condenses on the wall of glass jar and hence it appears as fine droplets.

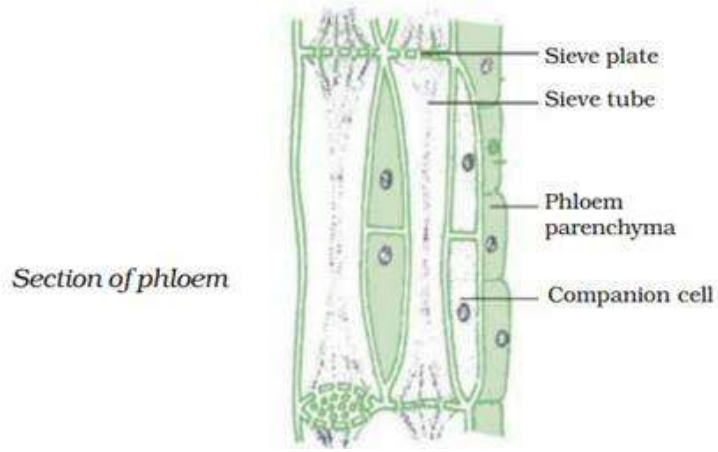
38. Name the different components of xylem and draw a living component?

Ans. Xylem consists of tracheids, vessels, xylem parenchyma and xylem fibres.



39. Draw and identify different elements of phloem.

Ans. Sieve tubes, companion cells, phloem fibres and phloem parenchyma.



40. Write true (T) or false (F)

(a) Epithelial tissue is protective tissue in animal body.

(b) The lining of blood vessels, lung alveoli and kidney tubules are all made up of epithelial tissue.

(c) Epithelial cells have a lot of intercellular spaces.

(d) Epithelial layer is permeable layer.

(e) Epithelial layer does not allow regulation of materials between body and external environment.

Ans. (a)—T, (b)—T, (c)—F, (d) —T, (e)—F

41. Differentiate between voluntary and involuntary muscles. Give one example of each type.

Ans.

Voluntary muscles	Involuntary muscles
(i) Their action is under our conscious control.	(i) Their action is not under our conscious control.
(ii) Cells are multinucleate.	(ii) Cells are uninucleate.
(iii) Example: Skeletal muscles	(iii) Example: Smooth muscle

42. Differentiate the following activities on the basis of voluntary (V) or involuntary (I V) muscles.

(a) Jumping of frog

(b) Pumping of the heart

(c) Writing with hand

(d) Movement of chocolate in your intestine

Ans. (a)—V, (b)—IV, (c)—V, (d) —IV

43. Fill in the blanks

(a) Lining of blood vessels is made up of _____.

Ans. squamous epithelium

(b) Lining of small intestine is made up of _____.

(c) Lining of kidney tubules is made up of _____.

Ans. cuboidal epithelium

(d) Epithelial cells with cilia are found in _____ of our body.

Ans. respiratory tract

44. Water hyacinth float on water surface. Explain.

Ans. A special type of parenchyma; called aernchyma is present in water hyacinth. This tissue has air-filled spaces inside and because the air gets trapped inside especially in the stem part so it becomes buoyant. Due to this, water hyacinth floats on water surface.

45. Which structure protects the plant body against the invasion of parasites?

Ans. Epidermis having thick cuticle and dermal tissue to prevent the invasion of parasites and other harmful agents.

46. Fill in the blanks

(a) Cork cells possesses _____ on their walls that makes it impervious to gases and water.
Ans. suberin

(b) _____ have tubular cells with perforated walls and are living in nature.
Ans. sieve tubes

(c) Bone possesses a hard matrix composed of _____ and _____.
Ans. calcium and phosphorus

47. Why is epidermis important for the plants?

Ans. Epidermis is important for plants due to the following reasons :

(i) it gives protection
(ii) helps in gaseous exchange
(iii) checks water loss
(iv) root hairs arising from epidermis helps in absorption of water and minerals.

(a) _____ are forms of complex tissue.

Ans. Xylem and phloem

(b) _____ have guard cells.

Ans. Stomata

(c) Cells of cork contain a chemical called _____.

Ans. Suberin

(d) Husk of coconut is made of _____ tissue.

Ans. Sclerenchyma

(e) _____ gives flexibility in plants.

Ans. Collenchyma

(f) _____ and _____ are both conducting tissues.

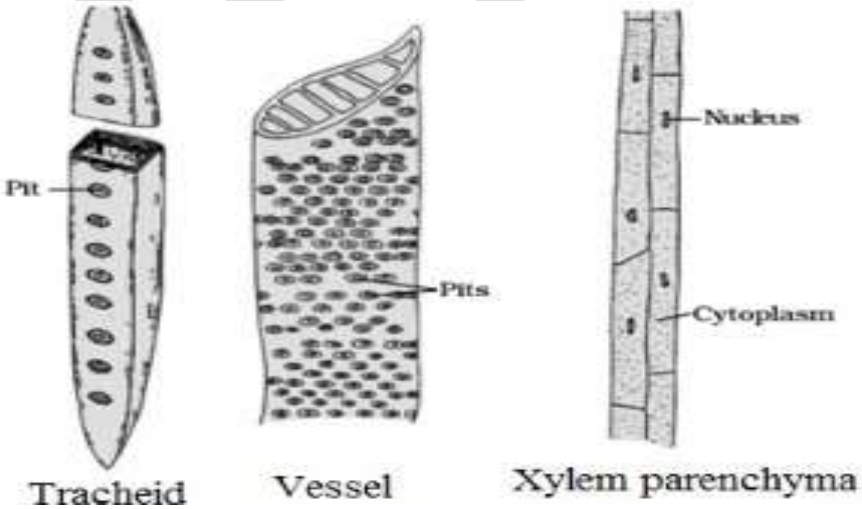
Ans. Xylem; phloem

(g) Xylem transports _____ and _____ from soil.

Ans. Water; minerals

(h) Phloem transport _____ from _____ to other parts of the plant.

Ans. food; leaves



Chapter 7

Diversity in Living Organisms

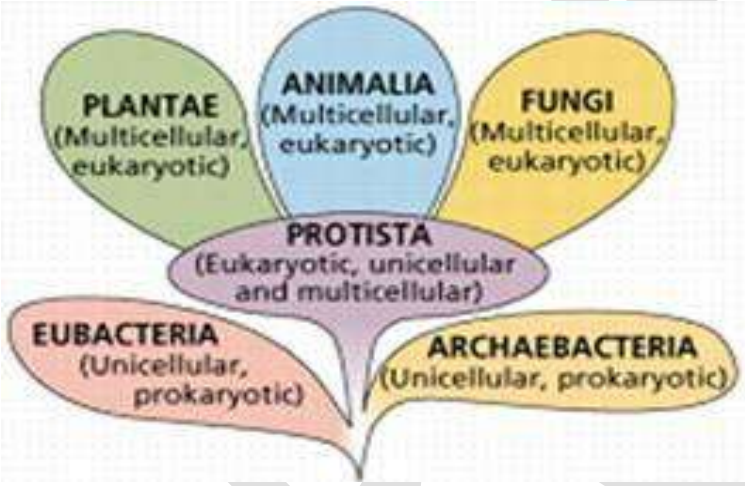
1. Each **organism** is different from all other organisms.

2. The presence of various forms of plants and animals is known as diversity.

3. Greek thinker Aristotle classified animals according to whether they lived on land,in water or in air. This classification is a landmark in ideology, but has limitations. For example, animals that live in the sea include Corals, Whales, Octopus, Starfish, and Shark. In fact they are different from each other.

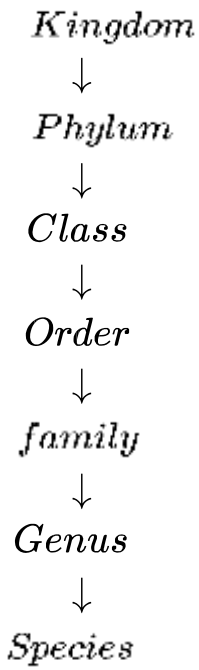
4**. Classification and Evolution**: organisms are classified based on body design, hierarchy in developing, relation to evolution. Charles Darwin first described the idea of evolution in 1859 in his book **" The Origin of Species"**

5. The Biologists, such as Haeckel, Whittaker & Carl Woese tried to classify all living organisms into broad Kingdoms. **The Whittaker proposed five kingdoms: Monera, Protista, Fungi, Plantae and Animalia. Carl Woese introduced by dividing Monera into Archaebacteria and Eubacteria.**



6. Hierarchy of Classification :

Linnacus's System of Classification



7. **Monera**: They have unicellular, Prokaryotic organisms (do not have defined nucleus or organelles). The cell wall may or may not present. The mode of nutrition is autotrophic (synthesizing food on their own) (or)heterotrophic (getting food from environment). Ex. Bacteria, Anabaena.

8. **Protista:** They have unicellular eukaryotic **organisms** (do have well defined nucleus or organelles). The body is covered by cilia, **flagella for locomotion**. The mode of nutrition is **autotrophicorheterotrophic.** Ex. Diatoms, protozoans.

9. **Fungi**: These are multi-cellular **eukaryotic organisms with cell wall, made up of**

Chitin. They do not perform Photosynthesis (**heterotrophic),Saprophytic** (derive nutrition from decaying material). Ex. Aspergillus, Penicillium, Mushroom, Rhizopus. The fungi living with algae forms Lichen (Symbiotic **Association)**

10. **Plantae**: These are multi-cellular eukaryotic organisms with cell wall, made up of Cellulose. Able to perform photosynthesis (autotrophic). **Ex. Rice, wheat**.

11. **Animalia:These are multi-cellular eukaryotic organisms without cell wall**. They are not able to perform photosynthesis (heterotrophic). **Ex Human beings, Peacock.**

DETAILS OF KINGDOM PLANTAE

1. **The kingdom Plantae is further classified as Thallophyta, Bryophyta, Pteridophyta,**

Gymnosperms, Angiosperms .

2. **Thallophyta:** The plants do not have well defined body design, commonly called as"

Algae", mostly aquatic. Ex. **Spirogyra, Ulothrix**.

3. **Bryophyta:** These are commonly called as the "Amphibians of Kingdom". The plant body is differentiated into roots like, stem like and leaf like structures. No specialized tissues for the conduction of water and food.Ex. Marchantia, Funaria.

4. **Pteridophyta:** These are commonly called as the "**First vascular land plants** ". The plant body is differentiated into root, stem and leaf. Specialized tissues for the conduction of water and food are developed in these plants. The reproductive organs are inconspicuous. Ex. Marsilea, Fern.

Special Note: The reproductive organs are inconspicuous in Thallophyta, Bryophyta,72 Pteridophyta are can't develop seeds. They are together called as" Cryptogamae (Non-Flowering Plants)". The plants with well differentiated reproductive organs and thatultimately make seeds are called" Phanerogams (Flowering Plants)". This group is further classified Gymnosperms (Bear naked Seeds) &Angiosperms (Bears seeds inside Fruit).

5. **Gymnosperms**: These are commonly called as "Naked seed bearing plants". They areusually perennial, evergreen and woody. Ex. Pinus, Cycas

6. **Angiosperms**: These are commonly called as **"Enclosed seed bearing plants".** Plants with seeds having a single cotyledon are called as" **Monocotyledons or Monocots**". Plants with seeds having two cotyledons are called as "**Dicots". Ex. Ipomoea, Paphiopedium.**

<u>DETAILS OF KINGDOM ANIMALIA</u>

These are Eukaryote, multicultural and hetero-tropic.

They are further classified as **Non-Chordates**(Porifera, Coelenterata, Platyhelminthes , Nematoda, Annelida, Arthropoda, Mollusca, Echinodermata) and **Chordates** { Protochordata, Vertebrata (Pisces, Amphibians, Reptilia, Aves, Mammalia)} .

I. **Non- Chordates**

1. **Porifera:** The word Porifera" **means organisms with holes". The canal system** helps in circulating water, food, oxygen. They are non-motile with cellular level of organization and mainly **marine** organisms with hard outer coat called as Skeleton. They are commonly called as **Sponges. Ex. Spongilla, Sycon.**

2. **Coelenterata:** The word Coelenterata" **means organisms with body cavity Called Coelenteron"**. They are radially symmetrical, **Diploblastic** (two layers of cells), commonly called as Cnidarians (Stinging cells for protection are present in the body). Ex. Hydra, Sea Anemone.

3. **Platyhelminthes:** The word Platyhelminthes means organisms with flatworms (dorsocentrally flattened)". They are bilaterally symmetrical Triploblastic (three layers of cell), either free-living or parasitic. No true Coelom is present - Acoelomates. Ex. Planaria (Free living), Tape worm(Parasitic)

4. **Nematoda:** The word Nematoda "means organisms with roundworms". They are bilaterally symmetrical Triploblastic (three layers of cells), familiar with parasitic worms. The false Coelom is called as Pseudocoelome. Ex. Ascaris, Wuchereria (Filarial worm causes elephantiasis).

5.Annelida: The word **Annelida " means organisms with metameric-segmented".** They are bilaterally symmetrical Triploblastic (three layers of cells) with closed circulatory system, familiar with earth worms. The Coelom is called as true Coelom. Ex. Neris, Earth worm, Leech .

6. Arthropoda: The word **Arthropoda** "means **organisms with jointed legs"** They are bilaterally symmetrical Triploblastic(three layers of cells), familiar with cockroaches. The Coelom is blood filled called as Haemo Coelom. Ex. Prawn, Scorpion, Housefly.

7. Mollusca: The word Mollusca "means organisms with soft body" They are bilaterally symmetrical, Triploblastic(three layers of cells), familiar with Octopus, Pila. Foot is for moving, kidney like organ for excretion, with open circulatory system. Ex. Unio, chiton.

8. Echinodermata: The word Echinodermata "means organisms with spiny skinned". Exoskeleton is with calcium carbonate. They are radially symmetrical Triploblastic (three layers of cells) with coelomic cavity, familiar with Star fish. They are exclusively free-living

II.**Chordates:** They are further classified as two major groups such as **Protochordata &Vertebrata**

(A).**Protochordata: Notochord present in at least larval forms, but very rudimentary**. It is a rod like supporting structure, runs along with nervous tissue from the gut of animal. They are bilaterally symmetrical, triploblastic (three layers of cells) with a Coelom, familiar with Amphioxus. Ex. Balanoglossus.

(B).Vertebrata: Notochord is replaced by vertebral column and internal skeleton. They are bilaterally symmetrical, triploblastic, coelomic and segmented having paired gill pouches. Vertebrates are grouped into five classes.

1. Pisces: These are commonly called as "**fishes",** exclusively aquatic. Body is streamlined and a tail for locomotion. Gills for respiration, heart is two chambered, cold blooded, skin is covered with scales, plates. They are cold-blooded animals. Skeleton of bone (Rohu) / cartilage(Shark). They lay eggs. Ex. Lion Fish, Dog Fish.

2. Amphibians: These are commonly called as "Amphibians" because they can live on land and in water". Body is streamlined and a webbed foot/ foot for locomotion. Gills or lungs or skin for respiration, heart is three chambered, cold blooded, skin is lack of scales, plates. They are cold-blooded animals. They lay eggs. Ex. Rana, Hyla .

3. **Reptilia**: These are commonly called as "Reptilians". A lung for respiration, heart is three chambered (Crocodile heart is four chambered), skin have scales. They are cold-blooded animals. They lay eggs. Ex. Snakes, Turtles

4. **Aves** :These are commonly called as "Birds". A lung for respiration, heart is fourchambered, fore limbs are modified for flight, skin has feathers. They are warm-blooded animals. They lay eggs. Ex. Ostrich (Flightless Bird), Pigeon, Sparrow .

5**. Mammalia**: These are commonly called as "animals with mammary glands for producing milk to nourish their young ones". A lung for respiration, heart is four chambered, skin has hairs, sweat or oil glands. They are warm-blooded animals. They lay eggs (Platypus, Echidna), give birth to young ones poorly developed (Kangaroo) & give birth to

DETAILS OF NOMENCLATURE

NOMENCLATURE: The system of scientific naming or nomenclature was introduced by Carolus Linnaeus. It is unique to identify in the world. We limit ourselves to writing the names of the Genus and Species of that particular organism. The world over, it has been agreed that both these names will be used in Latin forms.When printed is given in italics and when written by hand, the Genus and Species name have to be underlined separately. Ex. Human (Common name): *Home sapiens* (scientific name with two parts namely the Genus and Species). (Page No. 80)

1. Why do we classify organisms?

Ans. A large number of organisms exist on this earth. We cannot study such enormous biodiversity one by one i.e. studying variety of life forms individually is an impossible task. Hence, we make groups or categories of organisms depending upon their similarities and dissimilarities with other organisms. This allows an easier and systematic study of the life forms.

2. Give three examples of the range of variations that you see in life forms around you.

Ans. i) Life forms vary in their size – Some organisms are too small and cannot be seen with

naked eyes like microorganisms while others are too big like the biggest animal which is the blue whale.

ii) Number and type of cells – Some organisms have a prokaryotic cell like bacteria and that single cell performs all the required functions while others have eukaryotic cells organized into tissue, organ and even organ systems like human beings.

iii) Mode of nutrition – Some organisms are autotrophic i.e. capable of making their own food eg plants while other organisms are heterotrophic i.e. they are dependent on other organisms for their food supply.

(Page No. 82)

1. Which do you think is a more basic characteristic for classifying organisms?

(a) the place where they live.

(b) the kind of cells they are made of. Why?

Ans. The classification of organisms based on the place where they live is not quite convincing because other living in the same habitat they hardly share any other feature for example whales, corals, starfishes, octopus, fishes, sharks etc all are

aquatic i.e. they live in water their appearance and all other features are very different.

Therefore classification of organisms based on the kind of cells they are made of is more widely accepted. For such catergorisation organisms belonging to prokaryotic group will have a particular cell structure and functional pattern which will be different from the eukaryotic group.

2. What is the primary characteristic on which the first division of organisms is made?

Ans. The primary characteristic on which the first division of organisms is made is that whether the organisms are prokaryotic or eukaryotic.

3. On what bases are plants and animals put into different categories?

Ans. On the basis of their mode of nutrition as well as their body designs plants and animals are put into different categories. Plants are autotrophic and perform photosynthesis whereas animals are heterotrophic and get food from the outside. Plant cells have cell wall whereas animal cells do not have any cell wall.

(Page No. 83)

1. Which organisms are called primitive and how are they different from the so-called advanced organisms?

Ans. Such organisms that possess quite simple structure and their body design haven't changed much from their ancient sort of details even after long period of evolution on earth are called as the primitive organisms like bacteria who are still single celled and prokaryotic while advanced organisms have complex body design like trees and humans.

2. Will advanced organisms be the same as complex organisms? Why?

Ans. Yes we can say that the advanced organisms are the same as complex organisms because advancement has occurred due to the process of evolution where a group of simple organisms have changed themselves into the complex forms of life for better survival.

(Page No. 85)

1. What is the criterion for classification of organisms as belonging to kingdom Monera or Protista?

Ans. The criterion used for classification of organisms as belonging to kingdom Monera or Protista is their cell structure.Both Monerans as well as Protists are unicellular or single celled organisms but among monerans the cell is prokaryotic i.e. do not contain well defined nucleus while in protists the cell is eukaryotic i.e. have a well-defined nucleus.

2. In which kingdom will you place an organism which is single celled, eukaryotic andphotosynthetic?

Ans. Kingdom Protista.

3.In the hierarchy of classification, which grouping will have the smallest number of organisms with a maximum of characteristics in common and which will have the largest number of organisms?

Ans. Smallest number of organisms with a maximum of characteristics in common will be Species while grouping with largest number of organisms with common characteristics will be Kingdom.

(Page No. 88)

1. Which division among plants has the simplest organisms?
Ans. Division thallophyta.

2. How are pteridophytes different from the phanerogams?
Ans. Pteridophytes do not produce seeds but develop naked embryos while phanerogams

3. How do gymnosperms and angiosperms differ from each other?
Ans.

Gymnosperms	Angiosperms
They are plants producing male and female cones. They develop seeds but those seeds are naked i.e. fruits are not formed.	They are flowering plants hence produce flowers as reproductive organs. They develop seeds those are covered inside fruits i.e. fruit formation occurs.

(Page No. 94)
1. How do poriferan animals differ from coelenterate animals? Ans.

Poriferans	Coelenterates
They bear pores on their body.	Pores are absent on body.
They have cellular level of body organization.	They have tissue grade of body organization.
Mesoglea absent.	Mesoglea(body cavity) present.

2. How do annelid animals differ from arthropods?
Ans.

Annelids	Arthropods
Body cavity is true coelom.	Body cavity is haemocoel like in cockroach.
Body segmented and segments are called annuli.	Body segmented into head, mesothorax and met thorax.
Legs absent.	Three pairs of legs present.
Closed circulatory system.	Open circulatory system.

3 . How do amphibians animals differ from reptiles?
Ans.

Amphibians	Reptiles
Body is soft and slimy without scales.	Body is covered with scales.
Fertilisation external and lay eggs in water.	Fertilization internal and lay eggs on land eg turtles.

4. What are the differences between animals belonging to the Aves group and those in the mammalian group?

Ans.

Aves	Mammalia
They lay eggs from which young ones hatch out.	They give birth to the young ones.
Body is covered with feathers.	Body is covered with hairs.
Bones are hollow or pneumatic.	Bones are filled with bone marrow.

(Chapter – end)

1. What are the advantages of classifying organisms?

Ans. Because of the huge biodiversity i.e. variety of life forms existing on earth it becomes very difficult to study them individually so scientists have made groups of organisms based on their similarities and dissimilarities. Such categorization of organisms is known as classification which help us to study them easily and systematically.

2. How would you choose between two characteristics to be used for developing a hierarchy in classification?

Ans. We would choose the characteristic related to their structure and function that will help developing a hierarchy from one level to the next level. Like arthropods are organisms with jointed appendages but among arthropods insects and spiders make separate groups having peculiar characteristics to define them. Hence we can make the hierarchy in classification by selecting general to specific characteristics.

3. Explain the basis for grouping organisms into five kingdoms.

Ans. The basis for grouping organisms into five kingdoms is as follows:

a) The organisms are made of prokaryotic or eukaryotic cells.

b) The organism has a single cell in its body or is a multicellular life form.

c) The organism prepares its own food or is dependent on other for food.

4. What are the major divisions in the Plantae? What is the basis for these divisions?

Ans.

Thallophyta	Bryophyta	Pteridophyta	Gymnosperms	Angiosperms
Plant body not differentiated into root, stem and leaf.	Develop root like structures called rhizoids but lack vascular tissues.	Develop vascular tissue for conduction but lack seeds.	Develop naked sees and lack flowers.	Develop seeds covered inside fruits and produce flowers.

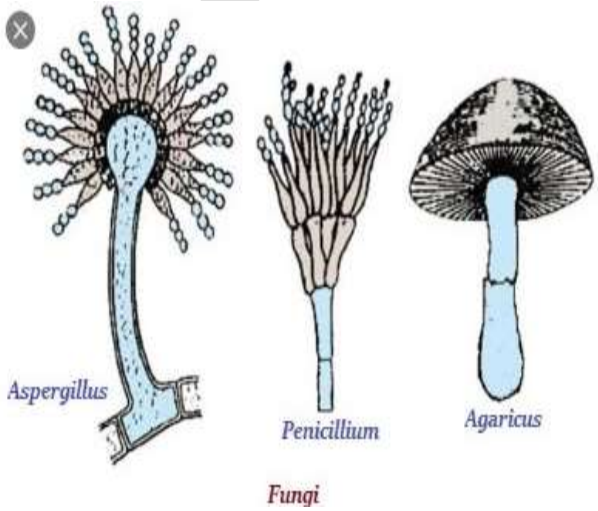
5. How are the criteria for deciding divisions in plants different from the criteria for deciding the subgroups among animals?

Ans. Animals are classified into subgroups on the basis of their level of body organization (cellular, tissue, organ grade) and symmetry, body cavity and presence or absence of notochord etc.

6. Explain how animals in Vertebrata are classified into further subgroups.

Ans. Animals in Vertebrata are classified into further subgroups based on their development of nervous system, circulatory system, reproductive methods etc. On the basis of the above mentioned characters the vertebrata is divided into following classes:

1. Exoskeleton of scales, breathing through gills - PISCES
2. Breathing through gills only in larva, skin slimy - AMPHIBIA
3. Exoskeleton of scales , laying eggs outside water - REPTILIA
4. Exoskeleton of feathers , lays eggs, flight possible - AVES (BIRDS)
5. Exoskeleton of hair, external ears, give birth to young ones - MAMMALIA



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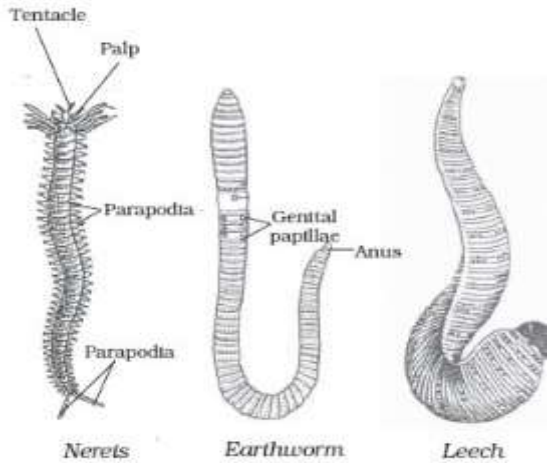
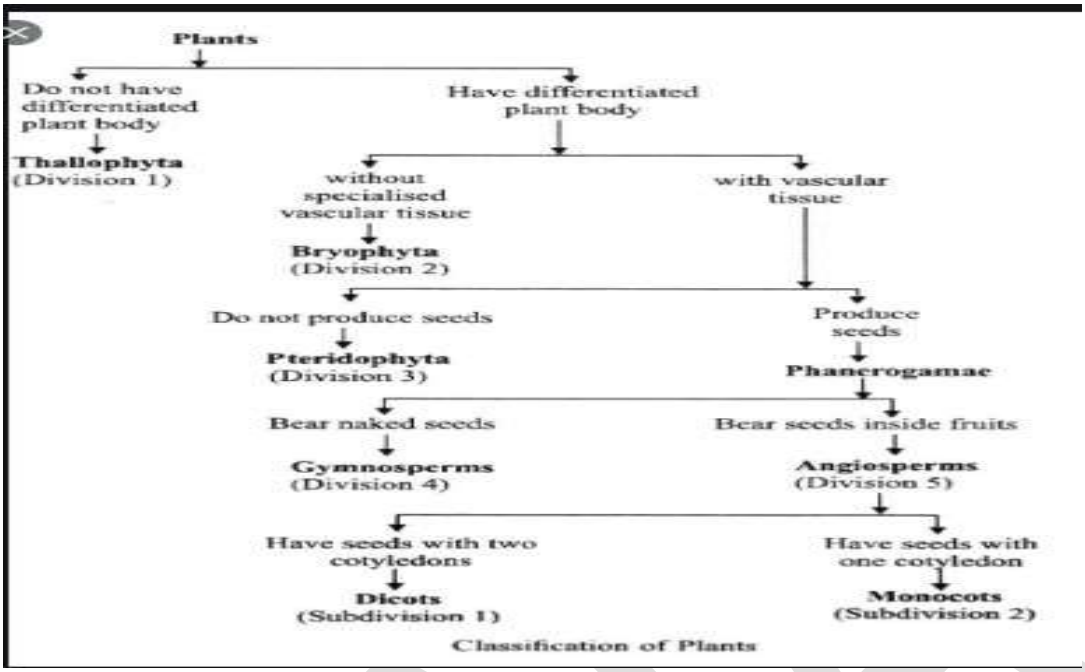


Nereis Earthworm Leech



Classification of Plants