Atomic Energy Education Society

Handout

CLASS IX BIOLOGY

CHAPTER – 6 TISSUES (Module 1)

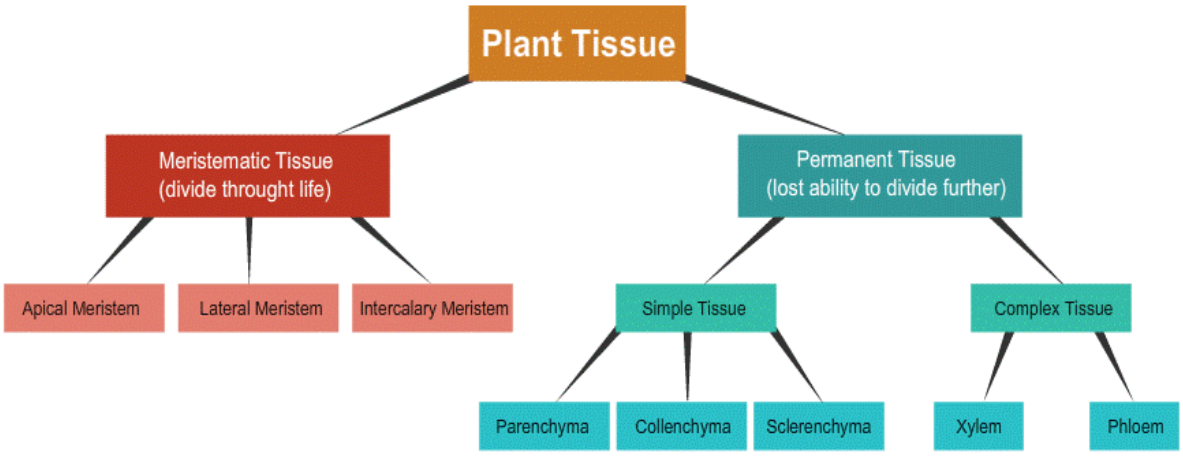
Plant Tissues

1. Tissues :- A group of cells that are similar in structure and/or work together to achieve a particular function forms a tissue

2. **Tissues of Plants and Animals**

Plant Tissues	Animal Tissues
Plants do not move so their tissues are predominantly the ones that provide support to them so that they can stand erect.	Animals need more energy as compared to plants because they are not stationary. Their tissues are the ones that can support movement.
These tissues are made up of dead cells because dead cells can also provide mechanical strength to the plants and do not require much maintenance.	The tissues in case of animals are made up of living cells so that they can move and perform several functions.
Only certain parts of the plant can grow. The tissues present in such regions of and divide themselves and form new tissues.	Cells in animals grow uniform early and not only in certain regions of the body.
The structure of plant tissues is not very specialized as compared to animals	The organs and organ systems in animals are highly developed.

3.**Classification of plant tissue**



4. **Meristematic Tissue**

. They are primarily made up of rapidly dividing cells. They are the growing tissues of the plant Cells of meristematic tissue are very active,they have dense cytoplasm, thin cellulose walls and prominent nuclei. They lack vacuoles.

They can further we classify differently based on the areas of the plants where they are located –Apical,Lateral and Intercalar

Apical Meristem	Lateral Meristem	Intercalary Meristem
• They are responsible for the growth of stems and roots in the plants • They are found on the tips of the roots and stems.	• They are responsible for increasing the circumference of the middle part of the stem and hence are found there.	• These tissues are present at internodes or stem regions between the places at which leaves attach.

5. **Permanent Tissue:**Permanent tissues arise from the meristematic tissue and have structural and functional properties. Permanent tissue can be made up of either living or dead cells.

6.Differentiation : Differentiation is the process by which the meristematic tissues develop into different types of permanent tissues based on the location and requirement of the plant.

7.**Permanent tissues are of two main types..** They are Simple permanent tissues and Complex permanent tissues

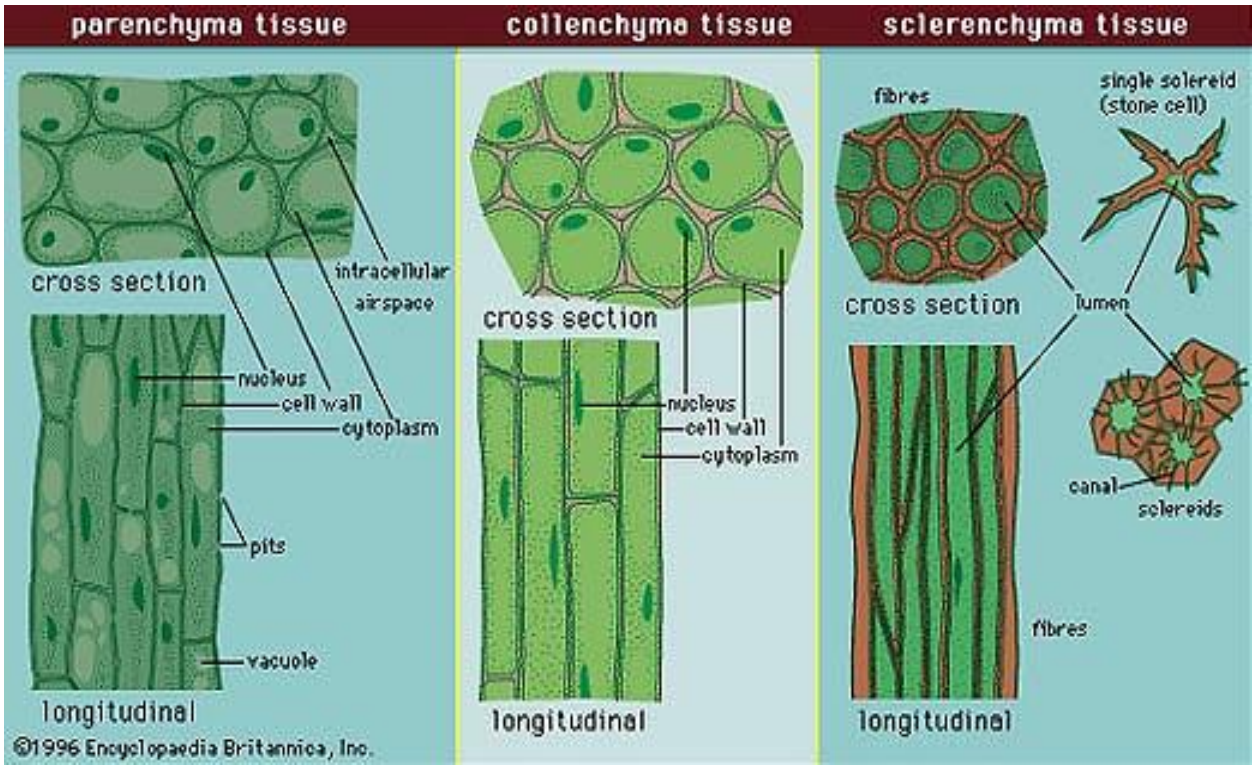
8.Simple permanent tissues are made up of one type of cells. They are of three types called Parenchyma, Collenchyma and Sclerenchyma.

9. Comparison of parenchyma ,collenchymas and sclerenchyma.

Parenchyma	Collenchyma	Sclerenchyma
These tissues are responsible for photosynthesis, storage of food, gaseous exchange and floating of plants.	These tissues are responsible for providing flexibility to the plants so that they can bend easily.	These tissues are responsible for making plants hard and rigid.
They are a group of living cells with cell wall made of cellulose.	They are a group of living cells with cell wall made of cellulose and pectin.	They are made up of dead cells having cell wall made of lignin.
The parenchyma cells have large intercellular spaces between them.	They have a little intercellular space in between them.	The cells do not have any intercellular spaces.

There are thin walls that surround each cell.	**The cells present in these tissues are broad and irregularly thick at corners.**	**The cells have a long structure with thick walls.**
They are found in leaves and newly formed branches.	**They are present in leaves and stems of a plant.**	**They are found in stems, veins of the leaves and coverings of nuts and seeds.**

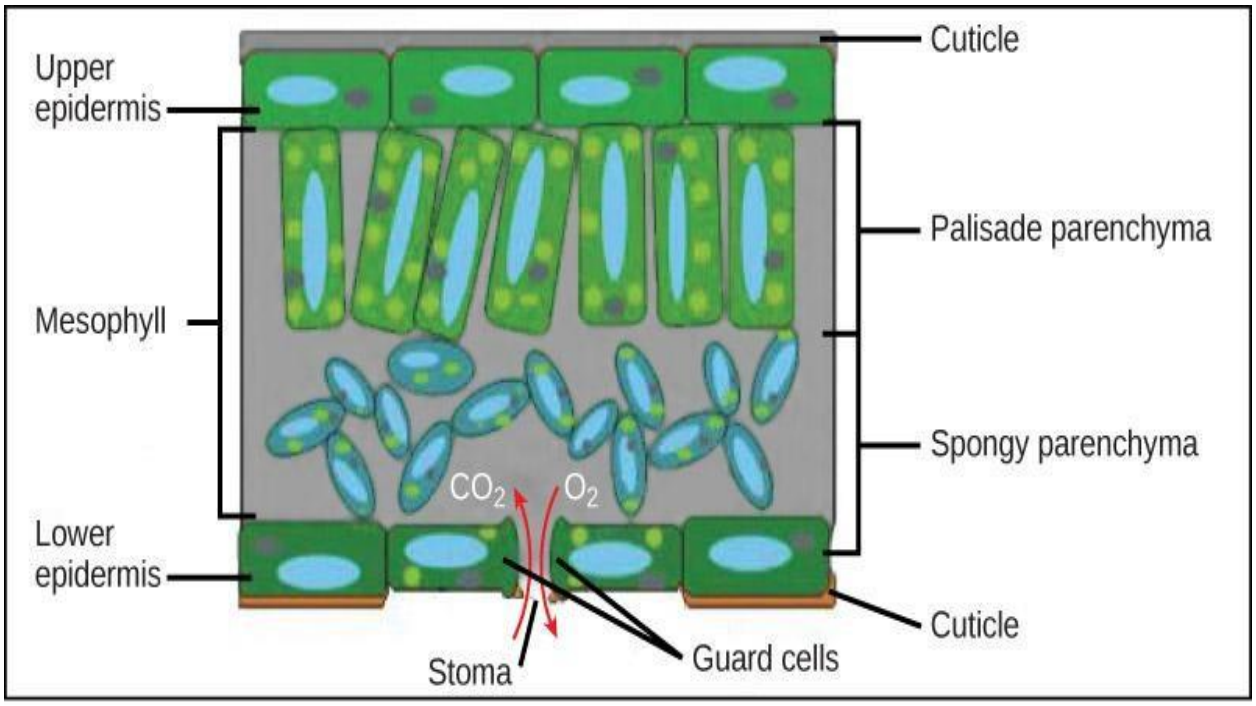
10.



11. **Epidermis**

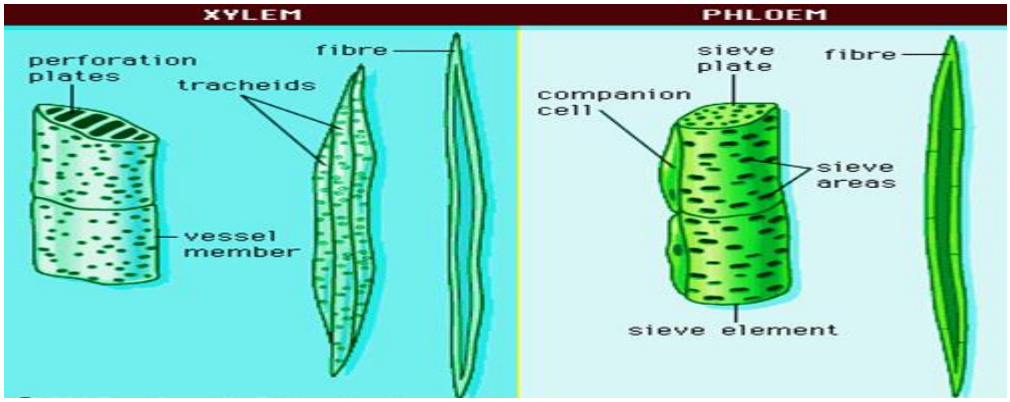
- The outermost layer of the cell is known as the **Epidermis**.
- It covers the entire plant.
- It is a thin layer of single cells but in places with less water, the epidermis of the plants can become thick in order to avoid frequent water loss.
- The cells are flat and they have no intercellular spaces between them.
- The outer walls of the epidermal cells are thick and the inner walls are thin.
- The epidermal cells often have long hair-like structures in roots which facilitate the absorption of water.

- The main function of the epidermis is to protect the plants from fungi, water loss and any injuries by secrets a wax-like water-resistant substance called as **Cuticle** on the surface of the plants which protects the plants.



12. **Cork Cells**: As plants grow older, the outer protective tissue, epidermis is lost and is replaced by Cork cells. Cells of cork are dead and compactly arranged without intercellular spaces. They also have a substance called suberin in their walls that makes them impervious to gases and water.

13. **Complex Permanent Tissues**: Complex permanent tissues are made up of more than one type of cells. There are two types of complex tissues. They are Xylem and Phloem. They are called vascular or conducting tissues.



14.Similarities between Xylem and Phloem

- Their main function is to carry food and water in the plant.
- Both have a vascular bundle which is a conductive tissue in plants that helps them survive in different environmental conditions.

15.Xylem

Xylem is made up of dead cells having a thick cell lining. It consists of following elements-

- **Tracheids and Vessels** – They have broad tubular structure so that we can allow transportation of food and water in the plants vertically.
- **Xylem Parenchyma** – It stores food and helps in transportation of water horizontally in the plants.
- **Xylem Fibers** – They support transportation

16.Phloem

Phloem is made up of living cells and it allows the movement of food from leaves to other parts of the plant. It has the following elements –

Sieve Tubes – Broad shaped cells with porous walls

- **Companion Cells** – They facilitate the functions of the sieve tubes
- **Phloem Fibers** – Provide flexibility to the phloem
- **Phloem Parenchyma** – Stores starch and proteins

17.Differences between Xylem and Phloem

Xylem	Phloem
It helps in the transportation of water from the soil to the roots and to the leaves of the plant.	**It transports food and water to all parts of the plant.**
Its movement of water is only in upward direction.	**Its transportation is in all directions.**
Xylem consist of tracheids, vessels, xylem parenchyma and Xylem fibres.	**Phloem consist sieve tubes, companion cells, phloem fibres and the phloem parenchyma**
Only Xylem parenchyma is living	**Only Phloem fibres are dead**

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