



SUBJECT:-BIOLOGY
CLASS IX : CHAPTER:- TISSUES

Guidelines: -

Dear Students,

- Refer to the following content of the chapter.
- These notes will help you understand the concept of the lesson.
- Do the assignment questions in the Biology notebook.

Link for Textbook:-http://ncertbooks.prashanthellina.com/class_9.Science.Science/CHAP%205.pdf

TOPIC:-

- Definition of Tissues
- Meristematic Tissues and Their Types.
- Permanent Tissues and Their Types.

Tissue

- A group of cells that are specialized to perform a particular function form a tissue.
For Example: - Muscles Bone and Blood.

Tissues are mainly classified into two types: -

1. Plant Tissues
2. Animal Tissues

1. Plant tissues

- Plants do not move, i.e., they are stationary. Most of the tissues they have are supportive, which provide them with structural strength.
- Most of these tissues are dead, as they can provide better mechanical strength than the live ones and need less maintenance.
- Some of the plant tissues keep on dividing throughout the plant life. These tissues are localised in certain regions.

2. Animal Tissues:

. Animals on the other hand move around in search of food, mates, and shelter. They consume more energy as compared to plants.

. Most of the tissues they contain are living.

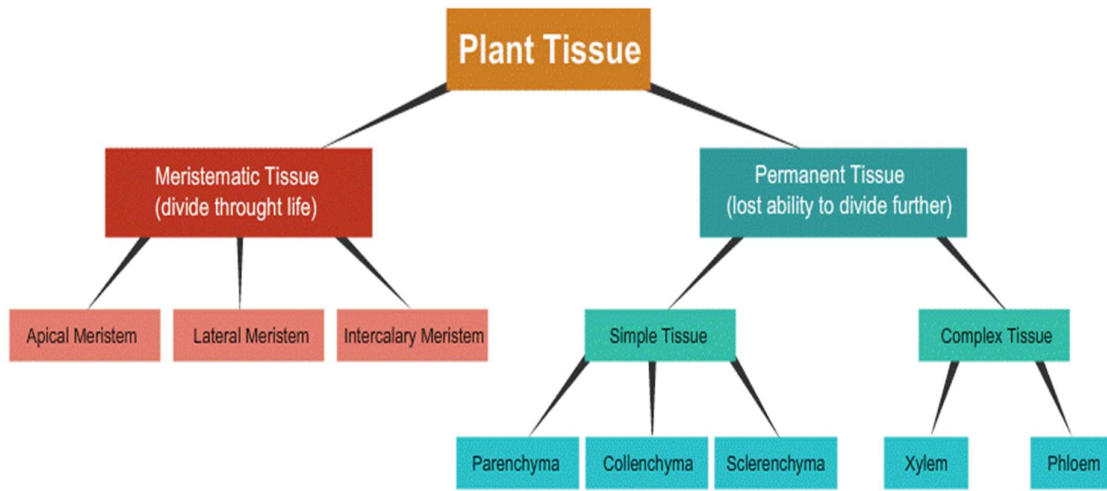
. Cell growth in animals is more uniform. So, there is no such demarcation of dividing and non-dividing regions in animals.

For better understanding of the concept watch this video carefully.

<https://www.youtube.com/watch?v=fNQ92ZGWpOA>

Types of Plant Tissues:

Based on the dividing capacity of the tissues, various plant tissues can be classified as growing or **meristematic tissue and permanent tissue** which further have sub-divisions as explained below:



A. Characteristic features of Meristematic Tissues: -

1. Meristematic tissues are responsible for growth in plants.
2. Cells in these tissues can divide and form new cells.
3. They have thin cell wall made of cellulose.
4. They have dense nucleus and cytoplasm but lack vacuoles.

Why there are no vacuoles in the meristem?

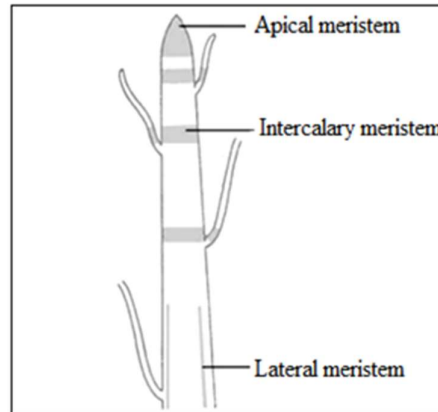
Vacuoles contain sap which provides rigidity to a cell. This property of vacuoles may not allow the meristematic tissues to divide and manufacture new cells. Hence vacuoles are not present in them.

Meristematic tissues are of three types:

(i) Apical Meristem: It is present at the growing tip of the stem and roots and increases the length.

(ii) Lateral Meristem (cambium): It is present beneath the bark. The girth of the stem or root increases due to lateral meristem (cambium).

(iii) Intercalary Meristem: It is present at internodes or base of the leaves and increases the length between the nodes.



**Location of meristematic tissue
in plant body**

B. Permanent Tissues

- The cells that are formed by the meristematic tissues often have to take a certain role in the plant and thus, they lose their ability to divide and form more cells. They then become the permanent tissues of the plants.

Differentiation - This process of taking up a permanent shape, size, and a function is called differentiation.

Permanent tissues are of two types:

- i) Simple tissues and ii) Complex tissues

(i) Simple tissues: This type of tissue is composed of same type of cells. These are again of three types: Parenchyma, Collenchyma, Sclerenchyma.

(ii) Complex tissues: This type of tissue is composed of more than two types of cells.

SIMPLE TISSUES:

(a) Parenchyma tissues: Cells of parenchyma tissues are living. They are oval, elongated and loosely packed with large inter-cellular space, forming basic packing of tissue, and are found throughout the plant body.

Functions of parenchyma:

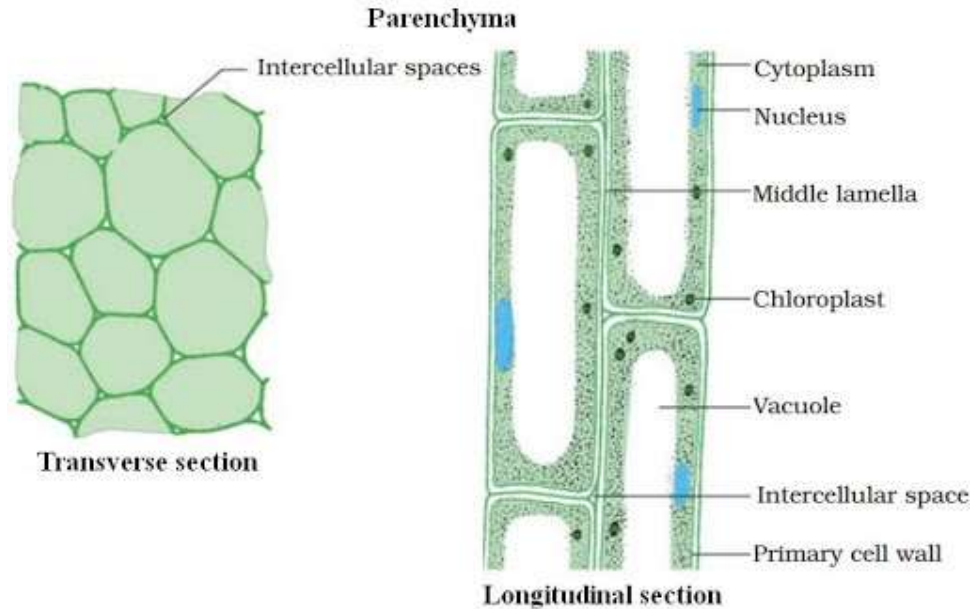
- They provide support to the plant body.
- They store food and nutrients in vacuoles.

Chlorenchyma

In some situations, Parenchyma contains chlorophyll and performs photosynthesis, and then it is called chlorenchyma.

Aerenchyma

In aquatic plants, large air cavities are present in parenchyma to give buoyancy to the plants to help them float. Such a parenchyma type is called aerenchyma.

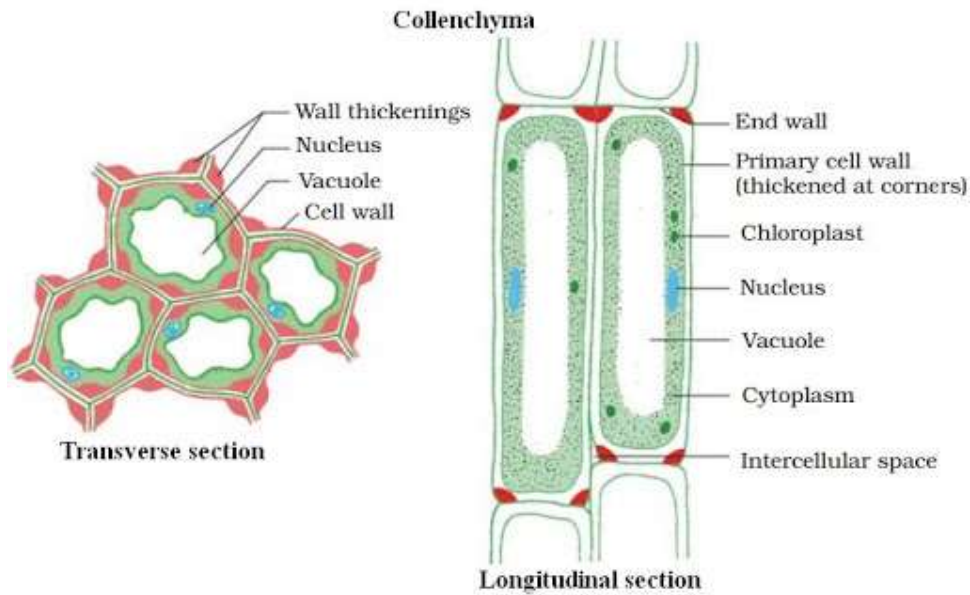


(b) Collenchyma Tissues:

1. Cells of collenchyma are living.
2. They are oval and elongated and tightly packed with no inter-cellular spaces.
3. They are found in leaf stalks below the epidermis.

Functions of collenchyma tissues:

- They provide mechanical support to the plant.
- They also provide flexibility to plants so that they can bend without breaking.



(c) Sclerenchyma Tissues: Cells of sclerenchyma are dead. They are narrow and elongated. The cell wall in sclerenchyma is composed of lignin which makes it hard. Often these walls are so thick that there is no internal space inside the cell

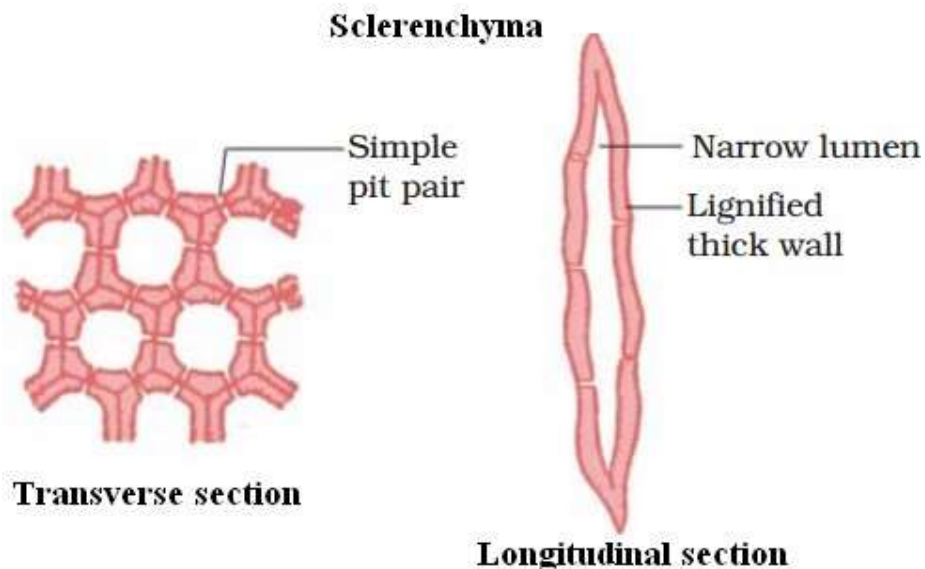
What is Lignin?

The cell walls of dead cells have a substance called lignin in them which provides rigidity to the cells.

Sclerenchyma are found around vascular bundles, veins of leaves in hard covering of seeds and nuts. For example: Sclerenchyma tissues are found in coconut husk.

Functions of sclerenchyma:

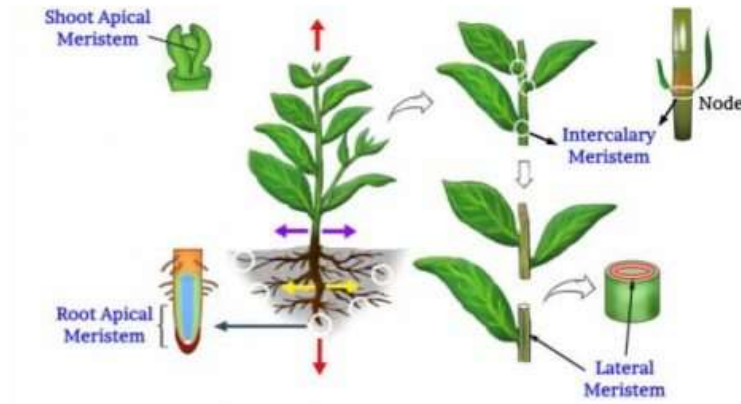
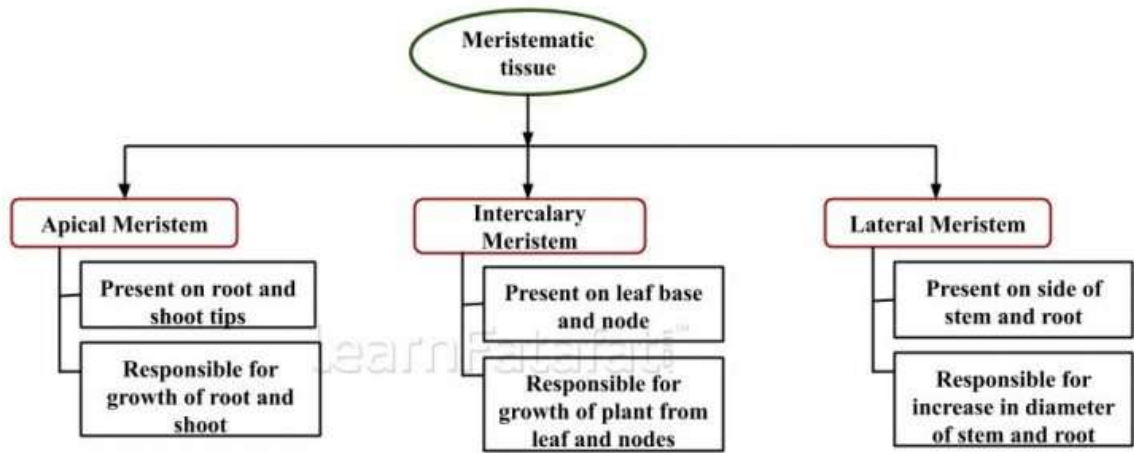
- They help to makes parts of plant hard and stiff.
- Also provides mechanical strength.



To have better understanding of the concept, watch the video by clicking on the link given below.

<https://www.youtube.com/watch?v=xWUuDM1g4Rg>

LET'S Summarise



Parenchyma	Collenchyma	Sclerenchyma
These tissues are responsible for	These tissues are responsible for	These tissues are responsible

photosynthesis, storage of food, gaseous exchange and floating of plants.	providing flexibility to the plants so that they can bend easily.	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.

ASSIGNMENT

Q1. Give reasons for the following:

- Meristematic cells have a prominent nucleus and dense cytoplasm, but they lack vacuole.
- Intercellular spaces are absent in sclerenchymatous tissues.
- We get a crunchy and granular feeling when we chew pear fruit.
- Branches of a tree move and bend freely in high wind velocity.
- It is difficult to pull out the husk of a coconut tree.

Q2. Compare and contrast the three types of meristematic tissues on the basis of their location and functions.