

## **Doomain Eukarya**

### Kingdom Plantae

- 1- Multicellular
- 2- Cellulose- rich cell wall
- 3- Use starch as a nutrient reserave
- 4- Usually photoautotrophic, using photosynthesis to convert solar energy into chemical energy in glucose
- 5- Chloroplast present, contain chlorophyll (a) and (b) and other pigments
- 6- Most plants live in tresterial habitats
- 7- Have alteration of generation (plant alternate between a diploid stage called sporophyte and a haploid stage called gametophyte.
- 8- Complex organ systems
- 9- Produce haploid spores

Plant can be classified by the presence or absence of vascular tissues (**which is formed of specialized cells for the transport of water and nutrients**)

- 1- Non- vascular plants (Bryophytes الحزازيات): simple non vascular plants, which means that don't have xylem or ploem, root, stem and leaves . And because they do not have the vascular system, bryophytes require an external source of water to survive, such as dew and rain.  
Ex. Liverworts الحزازيات الكبديه, Horneworts الحزازيات القرنيه, and Mosses الحزازيات الحقيقية.

### ***What is the importance of the Bryophytes??***

- a- Bryophytes colonize bare rock and they slowly convert the rocks to soil that can be used for the growth of other organisms.
- b- Sphagnum used to improve the water holding capacity of the soil

### ***How the bryophyte adapt for live on land??***

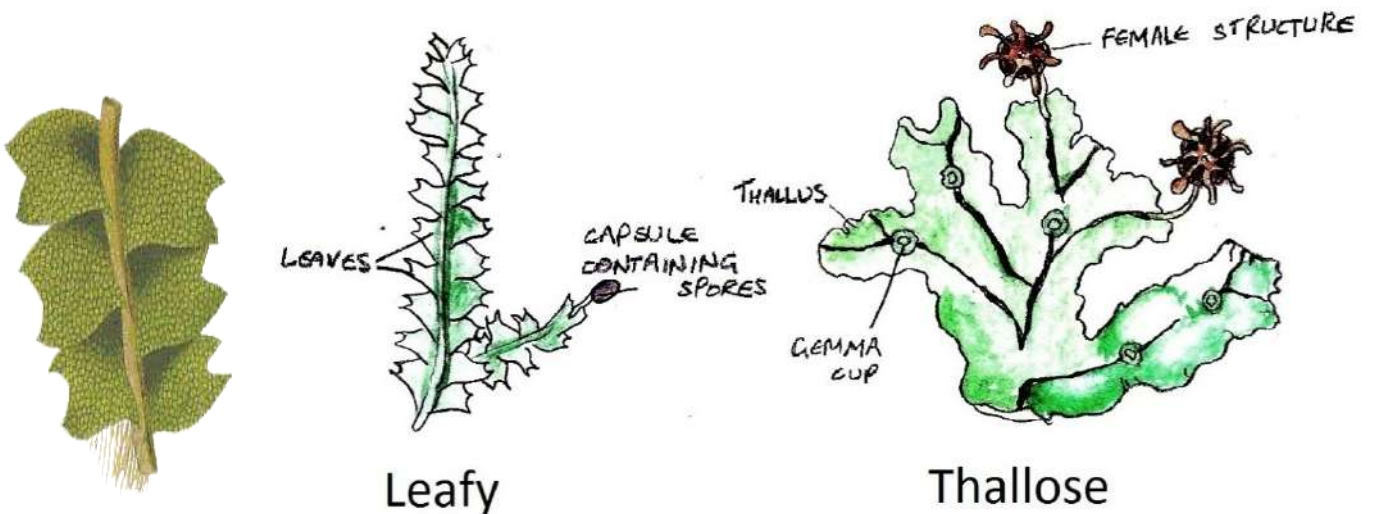
- a- Grow close to the ground, where they absorbe water and nutrients.
- b- Waxy covering over the epidermis of aerial plant partsto prevents desiccation “water loss”
- c- Small pore in the plant epidermis allows gas exchange for photosynthesis.
- d- Mostly reproduce asexually by the fragmentation.



**1 (a) Liverworts (Phylum Hepaticophyta)**

Characterization:

- 1- Shape resemble to human liver, which has lobes.
- 2- Size=1/2 mm- 20cm
- 3- Gametophytes are two general shapes
  - a- Leafy
  - b- Thallose (flat and ribbon like)



- 4- Reproduce asexually with pieces of tissue called Gemmae, presented on the upper surfaces of the gametophytes.

5- Reproduce sexually (sperm and ege)  
EX. *Riccia*

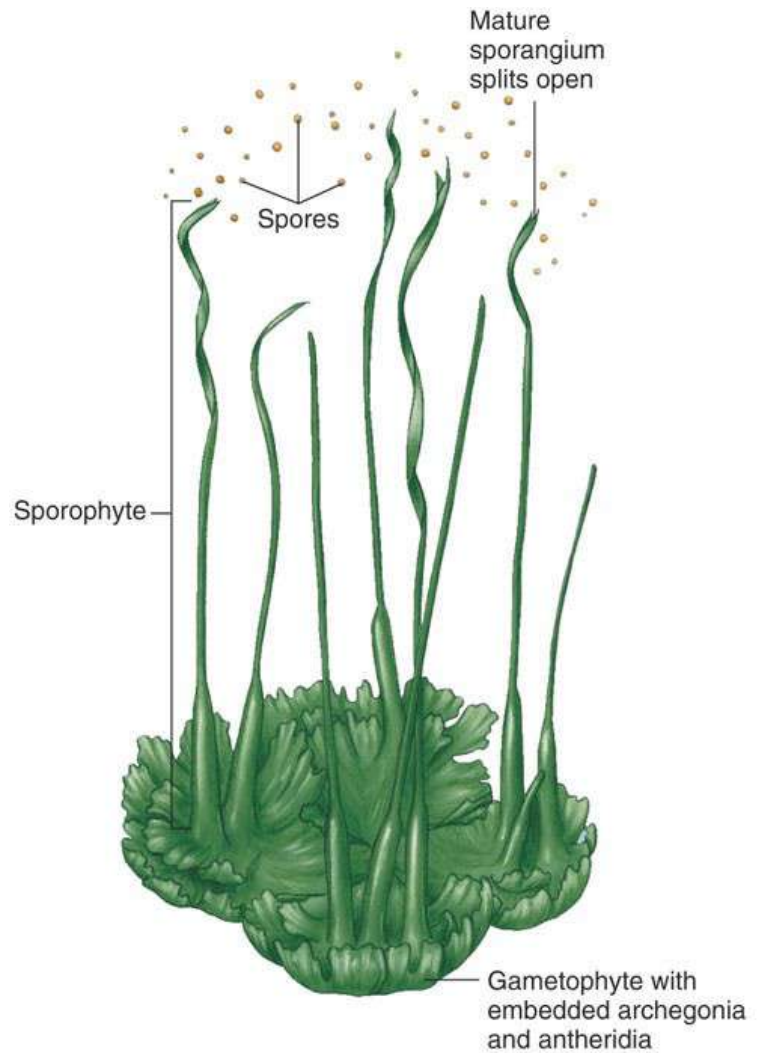
1(b) Hornworts (Phylum: Arthocerophyta):

- 1- sporophyte is shaped like a tapered horne(قرن مدبب), hence the name.
- 2- Cells have only one chloroplast each  
EX. *Lanularia*



(a) The gametophyte with mature sporophytes of the common hornwort (*Anthoceros natans*).

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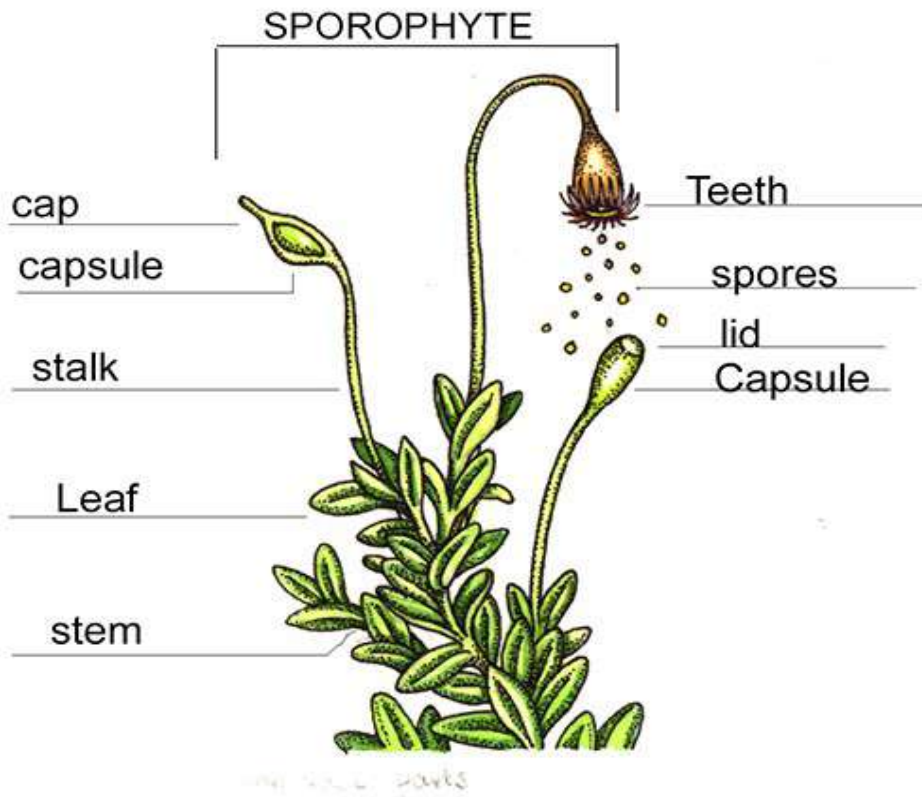
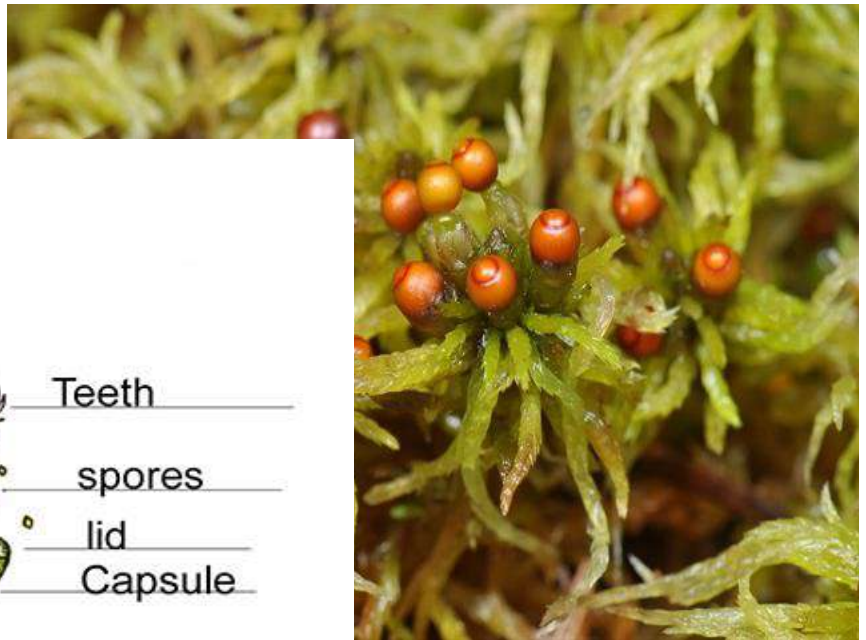
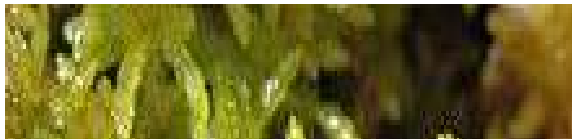
(b) After fertilization, the sporophytes project up out of the gametophyte thallus, forming "horns."

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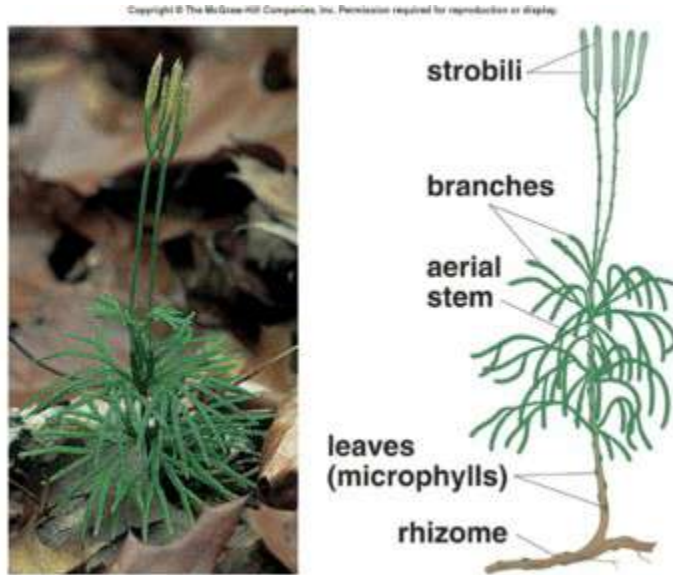
## 1 ( C) Mosses (Phylum: Bryophyta):

- 1- Living in diverse habitats including waterfalls, lava beds, at the mouth of caves and rocks
- 2- Gametophyte resemble leaves  
EX. Sphagnum

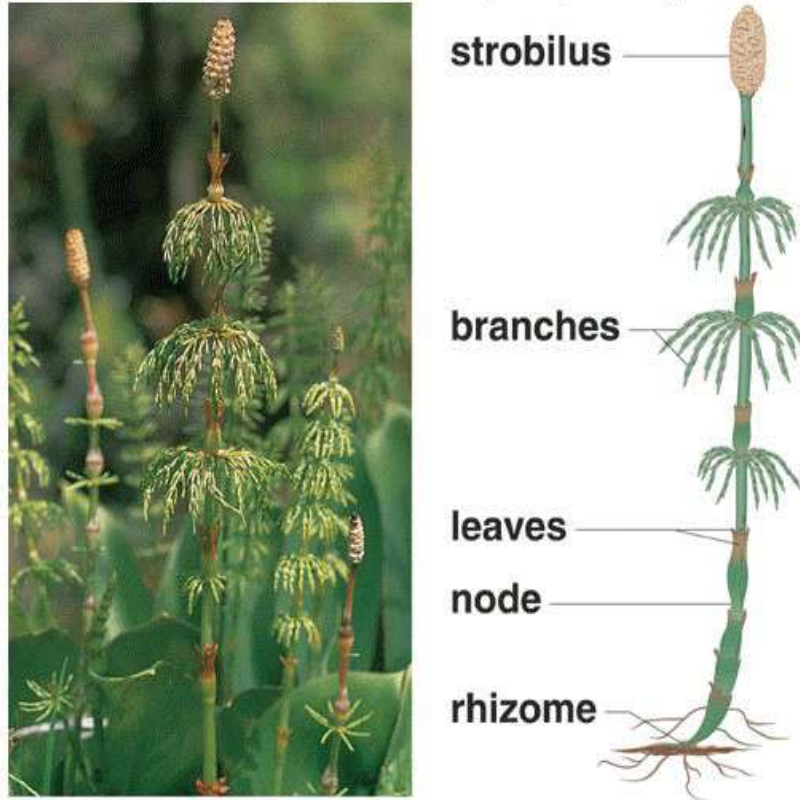


## 2-Vascular Plants:

- a- Seedless vascular plants:
    - Have a well developed cuticle
    - Stomata present (Tiny pores that regulate gas exchange).
- There are four groups make up the seedless vascular plants:
- 1- Club mosses (Phylum Lycopodophyta): الحزازيات الهراوية
    - Live in various habitats
    - Have leaves, stems and roots
    - Club-shaped reproductive structures
- EX. Lycopodium

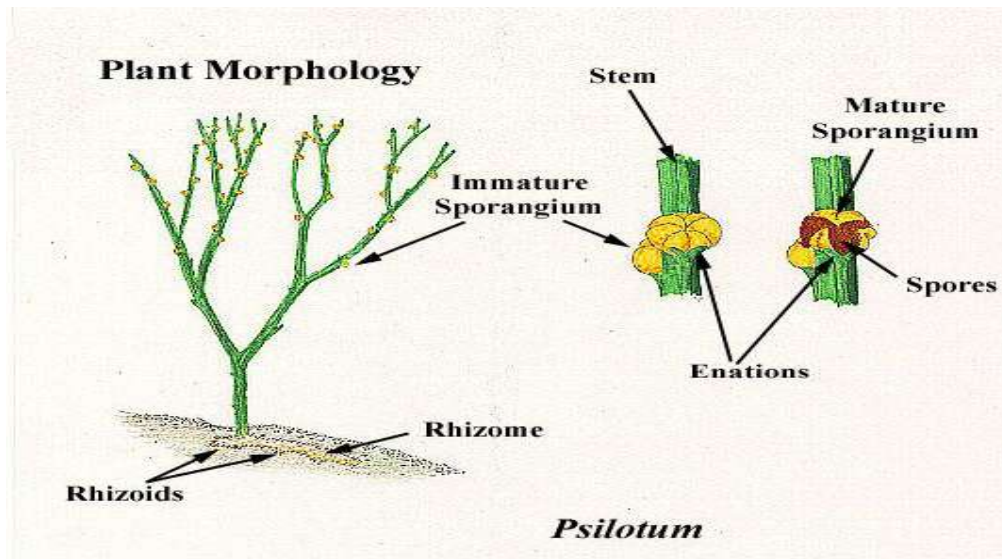


- 2- Horsetails (Phylum Sphenophyta):
    - Have a jointed stems that look somewhat like horse tails
    - Grow usually along streams or at the borders of the forests.
- EX. Equisetum



### 3- Whisk ferns (Phylum Psilophyta): السراخس المكنسية:

- Lacking roots
  - No obvious leaves
  - Instead of roots, whisk ferns have rhizome
- EX. Psilotum



#### 4- True ferns (Phylum Pterophyta)

- The leaves of fronds of the sporophyte are the most obvious feature
- New leaves coiled into structures called fiddleheads
- Fronds produce dark spots on their undersides called Sori( a collections of sporangia).

Ex. Phegopteris



- b- Seed- producing plants:
      - 1- Gymnosperms:
        - The sporophytes are woody trees or shrubs.
        - Animals, wind or moving water carry the pollen to the female gametophyte.
        - Produce huge amounts of pollen
          - There are four groups of the gymnosperm:
            - a- Cycads (Phylum Cycadophyta)
              - Live in the tropical and sub-tropical regions
              - Have palm like leaves
              - Plants are male and female
              - Produce large cones
                - Ex. Cycas
              - b- Ginkgos (Phylum Ginkgophyta).
                - Fan –shaped leaves
                - Tree either male or female
                  - Ex. Ginkgo
              - c- Conifers (Phylum Coniferophyta):
                - Have needle like or scale like leaves
                - Produce cones
                - Monoecious (Pinus) or Dioecious (Juniperus)
                - Sporophytes are woody trees
                - Gametophytes are reduced
              - d- Gnetophytes (Gnetophyta):
                - Having vessel elements (Which transport water) like flowering plants, Sogentophytes is closest relations to the flowering plants.
                  - Ex. Ephedra
- Angiosperm (Seed Palnt):Plant produce seeds enclosed in a structure such as a carpel or ovary:
- Are plants with flowers and fruits
  - More than 95% of modern plants are angiosperms
  - Dominate major terrestrial zones.
  - Angiosperms, especially grain groups such as wheat, rice and corn are staple in the human diet.



- Divided into major classes, these are monocotyledons(monocots) and dicotyledons (dicots) which are distinguished by whether there are one or two embryonic seed leaves or cotyledons
  - Most of the colorful and edible plants we use are members of this group
- What is the difference between monocot and dicot

Monocot	Dicot
Almost always herbaceous plants	Dicot are either herbaceous or woody plants
Parallel leaf veins	Net leaf veins
Vascular bundles scattered within the stem	Vascular bundles arranged in a circle within the stem
One cotyledon or seed leaf	Two cotyledons or seed leaves
EX. Date Palm	Ex. Pea and Roses

#### Adaptation of Angiosperms Plants

Angiosperms plants have true roots, stems and leaves. The reproductive organs are in the flowers, which often attract animal pollinators, ovules are located in ovaries that develop into fruit. Therefore, angiosperms produce covered seeds. Fruits often help with dispersal of seeds.

Stems are often conspicuous organ of plants and function for bear leaves and reproductive structures, support and transport water and solutes. But stem can store water like in succulent plants or food as in potato.

The major functions of root system are absorbing water and minerals, anchoring the plant, and storing food like sugar beets and carrot.

The major tissues and cell types in the plants:

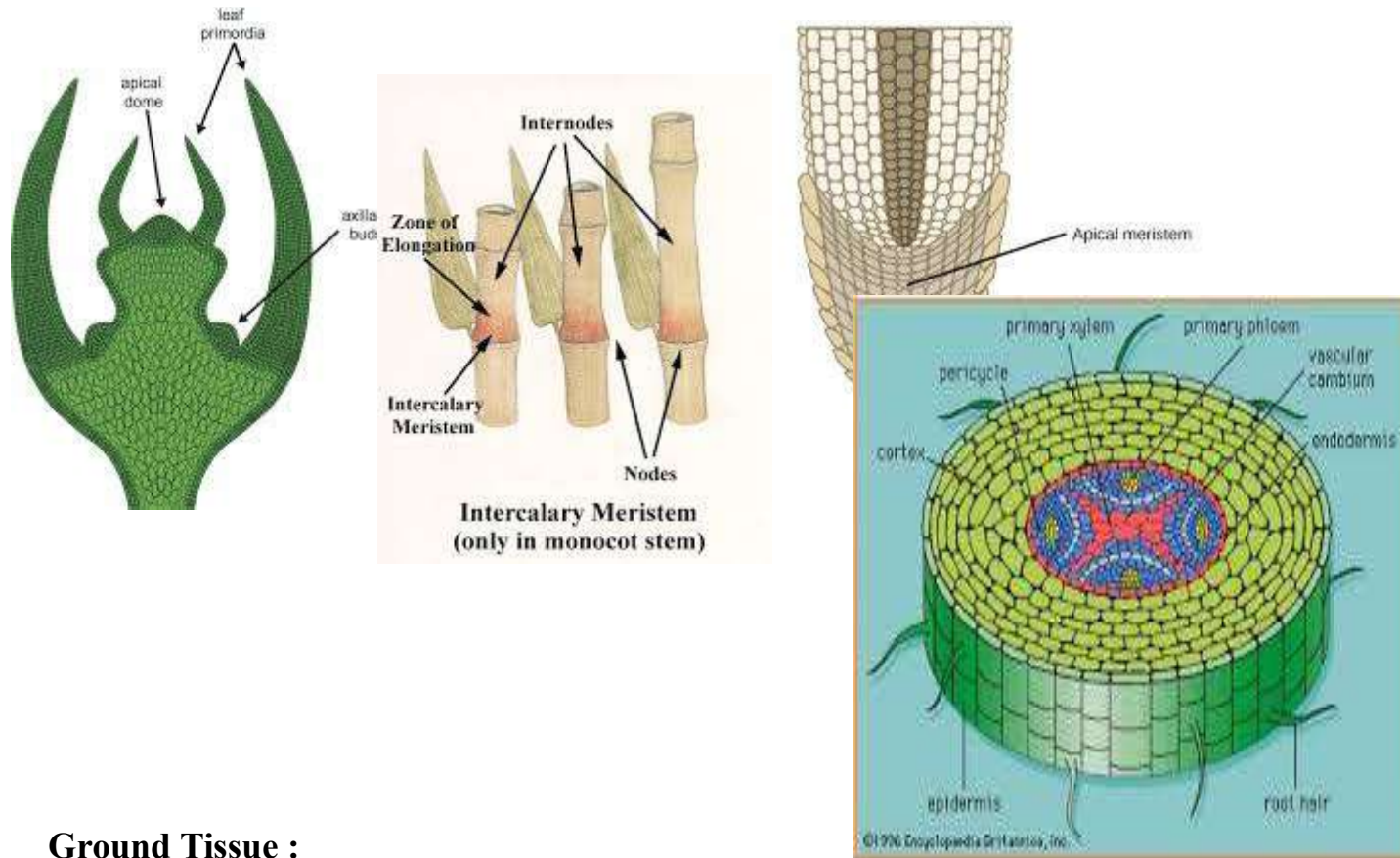
Plant bodies consist of four basic tissue types

Tissue Type	Cell type	Function
Meristem	Undifferentiated	Produce new cells
Ground	Parenchyma	Photosynthesis,

		storage and respiration
	Collenchyma	Elastic support
	Sclerenchyma	Non-elastic support
Dermal	Epidermal	Protection, Gas exchange (Stomata) and absorption (root hairs)
Xylem	Vessels and tracheids	Water and mineral conduction
	Parenchyma	Storage
	Sclerenchyma	Support
Ploem	Sieve tubes or sieve cells	Conduction of organic molecules
	Companion cells	regulate the activity of the adjacent sieve element
	Sclerenchyma	Support

### Meristem Types and functions

- 1- Apical meristem = Division of these cells always results in primary (vertical) growth, both at the root and shoot.
- 2- Lateral meristem = They produce secondary tissues from a ring of vascular cambium in stems and roots
- 3- Intercalary meristem= occurs only in monocot plant, at a base of nodes and leaf base allows rapid regrowth of mature leaves



**Ground Tissue :**

Makes up most of the primary body of the flowering plant, filling much of the interior of roots, stems and leaves. Ground tissue can be classified in three classes based on the nature of cell walls :

- 1- Parenchyma tissue
- 2- Collenchyma tissue
- 3- Sclerenchyma tissue.

**1- Parenchyma Tissue**

Parenchyma cells are the most abundant cells in the primary plant body. These living cells typically have thin primary cell wall.

Parenchyma cells can store, starch (in potato ), salts, pigments, oil, organic acid (oranges and lemons).

These cells conduct vital functions, such as photosynthesis, cellular respiration and protein synthesis.

**2- Collenchyma Tissue**

Collenchyma Tissue is composed of elongated **cells** with irregularly thickened walls. They provide structural support, particularly in

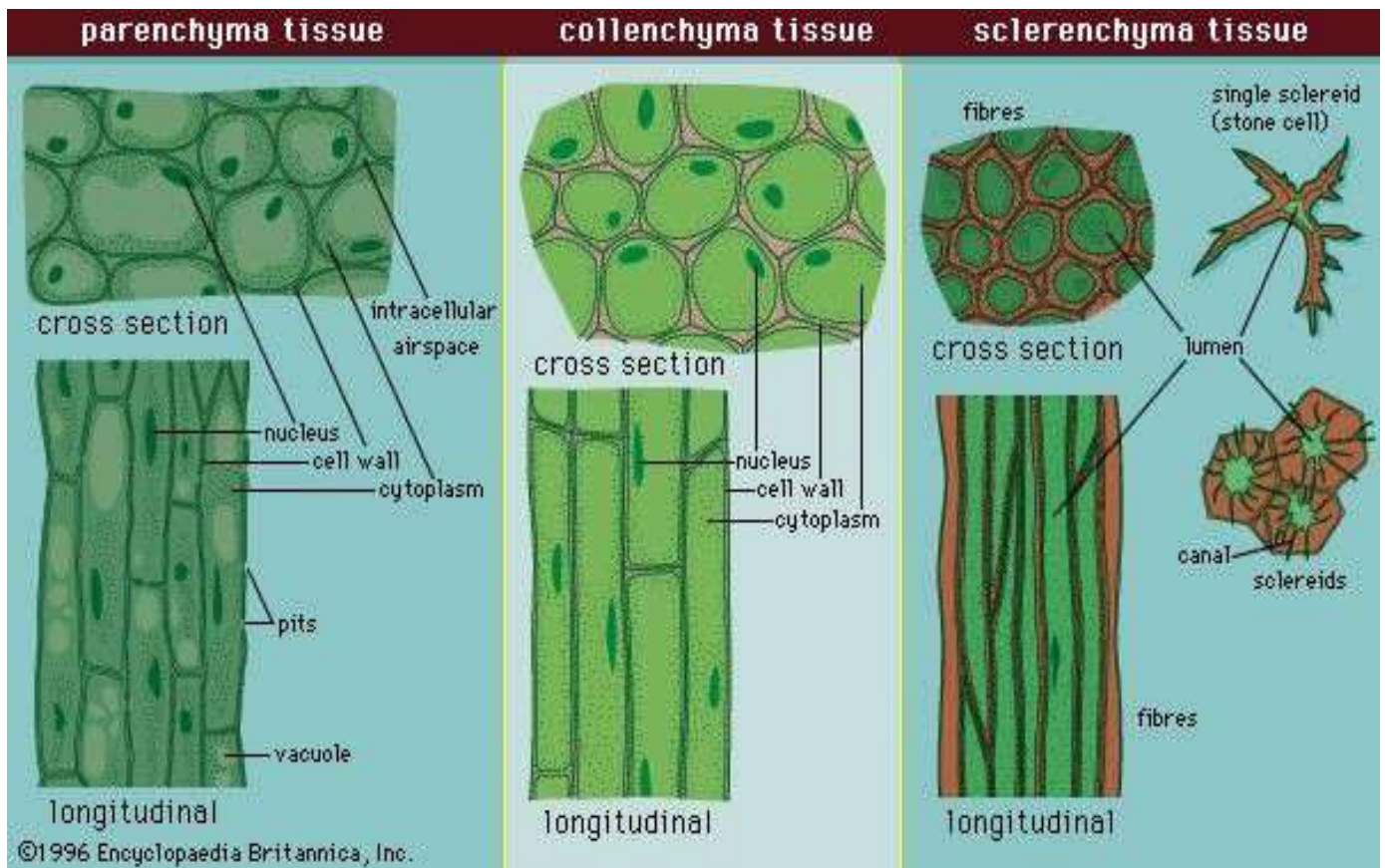
growing shoots and leaves. ... **Collenchyma cells** are usually living, and have only a thick primary **cell wall** made up of cellulose and pectin.

### 3- Sclerenchyma Tissue

**Sclerenchyma cells** are dead cells that have heavily thickened walls containing lignin. These cells serve the support function in plants. Such cells occur in many different shapes and sizes, but two main types occur: fibers and sclereids.

**Sclereides:** have many shapes and they occur singly or in groups.  
Ex. Gritty texture in pear

**Fibers:** are elongated cells that usually occur in strands that vary from a few to a few hundred millimeters. Fibers use in paper makes.



### Dermal tissue



The epidermis is a dermal tissue that is usually a single layer of cells covering the younger parts of plant. It secretes waxy layer called the cuticle that inhibits water loss.

Plants must exchange water and gases with atmosphere. They do this through specialized pores called (Stomata). **Guard cells:** are specialized cells in the epidermis of leaves, stems and other organs that are used to control gas exchange.

Trichoms: are outergrowth of the epidermis presented in nearly all plants. These have many functions, including deterrence of predators.

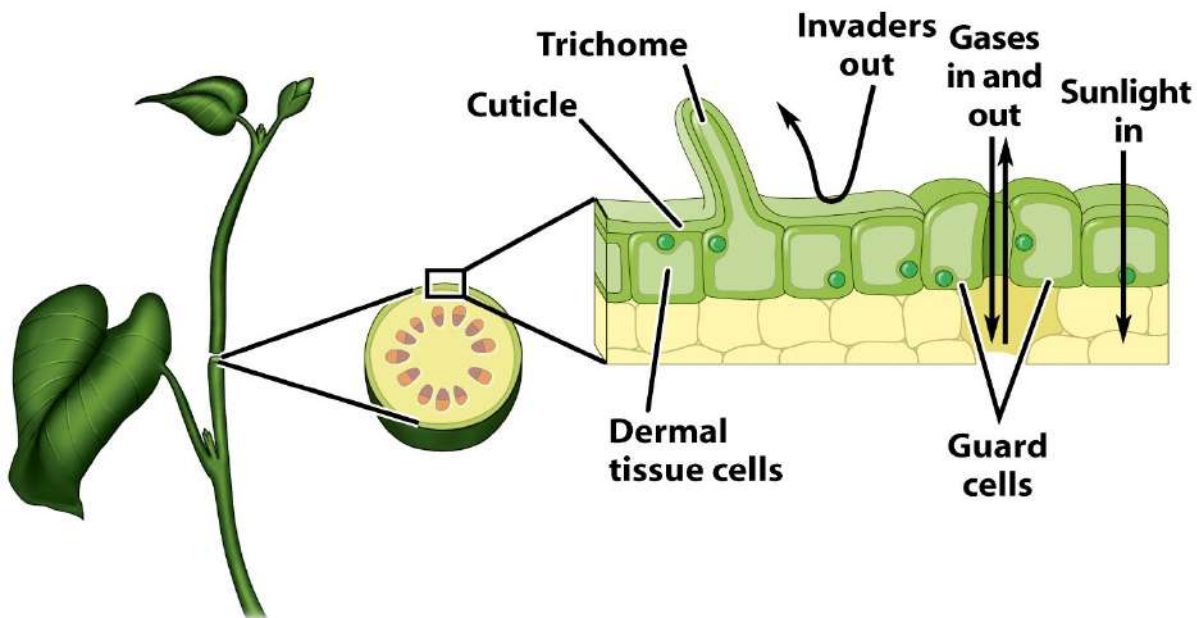


Figure 31-3 part 1 Discover Biology 3/e  
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### Vascular Tissue

Vascular tissue is a specialized conducting tissues that transport water, minerals, carbohydrates, and other dissolved compounds throughout the plant. The primary components of vascular tissue are , xylem and phloem.

Xylem: transports water and dissolved minerals from the roots to all parts of the plant, there are two kinds of conducting cells in xylem tissue these are vessels and tracheids.

Vessels:

These are short, wide barrel shaped cells, where water moves faster than in the narrow tracheids.

Tracheids:

These are more specialized conducting cells. Tracheids are long and narrow, overlapping at their tapered ends. Water moves from tracheid to tracheid through thin areas in cell wall called pits.

**Phloem Tissue:**

This tissue is specialized to transport organic compounds like (carbohydrates) throughout a plant. This tissue consist of two types of cells, Sieve tube and companion cells.

Sieve Cells: Usually found in gymnosperms, and are long tapering cells with overlapping ends. Phloem sap moves from cell to cell through sieve pores.

Sieve Tube: This part of phloem tissue found in angiosperms and they are more specialized than sieve cells. In most sieve tube members, the pore areas are aggregated into sieve plates, usually at the ends of cells.

Companion cells: Near the sieve tube members are companion cells, which are specialized parenchyma that help transfer carbohydrates into and out of the sieve tube members.

