Objectives:
1) Know the main tissues of the plant body.
2) Know the functions of the tissues.
3) Know what cell types are found in each tissue.

General Tissue Types

- Meristem
- Dermal Tissue
- Vascular Tissue
- Ground Tissue

Simple tissue are made up of mostly one cell type.
Complex tissues are composed of aggregates of different cell types.

Ground Tissue

- Most of the primary plant body is made of ground tissue.
- Functions of ground tissue include: storage, support, “metabolism.”
- Ground Tissue consists of the three main cell types:
  1) Parenchyma
  2) Collenchyma
  3) Schlerenchyma

<table>
<thead>
<tr>
<th>Cell Types</th>
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<tbody>
<tr>
<td>A) Parenchyma</td>
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<tr>
<td>• Most abundant cell type</td>
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<tr>
<td>• Mostly unspecilized, in respect to structure.</td>
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<tr>
<td>• They are “alive” at maturity</td>
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</table>
Example functions: storage (majority of a potato is parenchyma), photosynthetic cells in a leaf, structural filler (cortex and pith) in the stem

Some remain able to transform into other types of cells, as needed.

Best identified by what they lack. They lack secondary cell walls.

Specialized types of parenchyma cells:
- Chlorenchyma- parenchyma cells with chloroplasts. Usually in the leaf ground tissue.
- Aerenchyma – specialized parenchyma cells shaped and distributed so that there are large air spaces between cells.

![Fig 4.2](image)

B) Collenchyma
- Elongated cells with thick primary, stretchy cell walls (elastic).
- Cell walls unevenly thickened (and contain pectin).
- Originate from parenchyma and provide support to growing tissue.
- Cellery “strings” are made of collenchyma.

![fig 4.6, Atlas fig. 9a](image)

C) Schlerenchyma
- Cells with consistently thickened secondary cell walls
- They are often “dead” at maturity.
- They are the primary cell component of wood.
- Highly varied in shape & function.
  - Fibers are elongated schlerenchyma cells that usually grow in strands; hemp and sisal are made from fibers.
  - Schleroids occur as single schlerenchyma or as clusters of schlerenchyma cells

[MISC](image)
Dermal Tissue

Epidermis is a tissue that is one cell in thickness covering most of the plant’s (primary growth) interface with the environment.

- Epidermal cells are flat, transparent, and grow closely packed.
- Functions include: protection, gas exchange, secretion, and digestion.
- Special features of the epidermis include:
  - **Cuticle** – fatty material covering all but the roots – provides protection from desiccation (drying), predation, and infection.
  - **Stomata** – stomata pores and the guard cells surrounding them. The pores allow carbon dioxide (CO2) to enter the leaf for the photosynthesis and close to prevent water loss due to evapotranspiration.

Periderm is a protective outer tissue of multiple cells in thickness that forms over older stems and secondary growth.

Vascular Tissue (Xylem & Phloem)

- Conducting tissues forming leaf veins.
- Transport water, food (sugars), minerals, and other substances.

Xylem

- Continuous system transporting water containing dissolved nutrients upward from the roots
- Many cells are elongated, hollow, and with thickened walls to withstand the suction of the water being pulled up from the roots.
- But, cell all cell 3 main cell types can be found in xylem.
- Conducting cells types include:
  - tracheids
  - vessel elements
Phloem
Transports water and “food” in any direction
Most cells alive while functioning.
Parenchyma and sclerenchyma are normally found in phloem.

Common cell types:
  i. phloem fibers
  ii. sieve tube members
  iii. companion cells

Meristems

• Composed of parenchyma.
• Undifferentiated tissue from which new cells arise through cell division.
• Found in the root and shoot tips (apical meristems) & other specific regions.
• Apical meristems are responsible for primary growth and cellular differentiation.
• Plants continue to grow throughout their lives because of the presence of meristems.
• Some plants have outward growth called secondary growth, which occurs in lateral meristems.