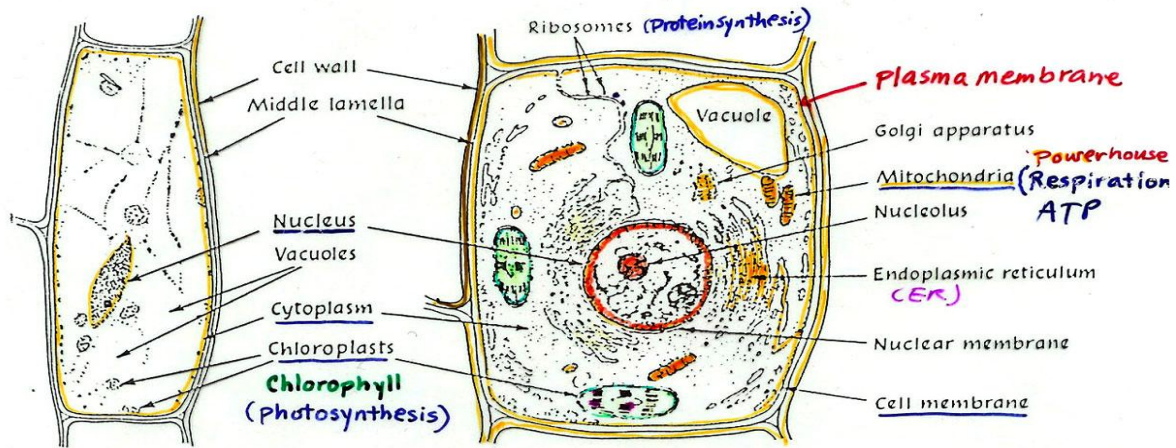
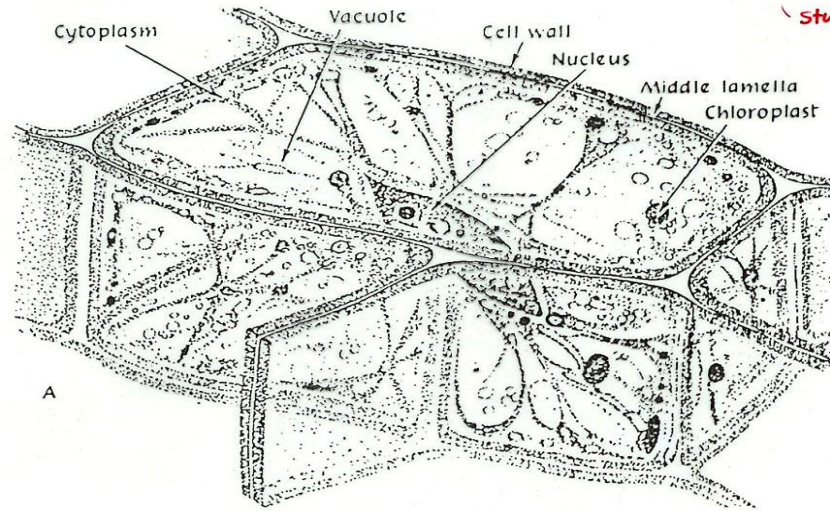


# **Chap 3. Plant Structure**

- 1. The cell and its components**
- 2. Tissues and their systems**
- 3. Anatomical regions**
- 4. Morphological structures**
  - Roots**
  - Shoots**
  - Leaves**
  - Flowers**
  - Seeds**

# Structure of the Cell

Cytology  
study of cells

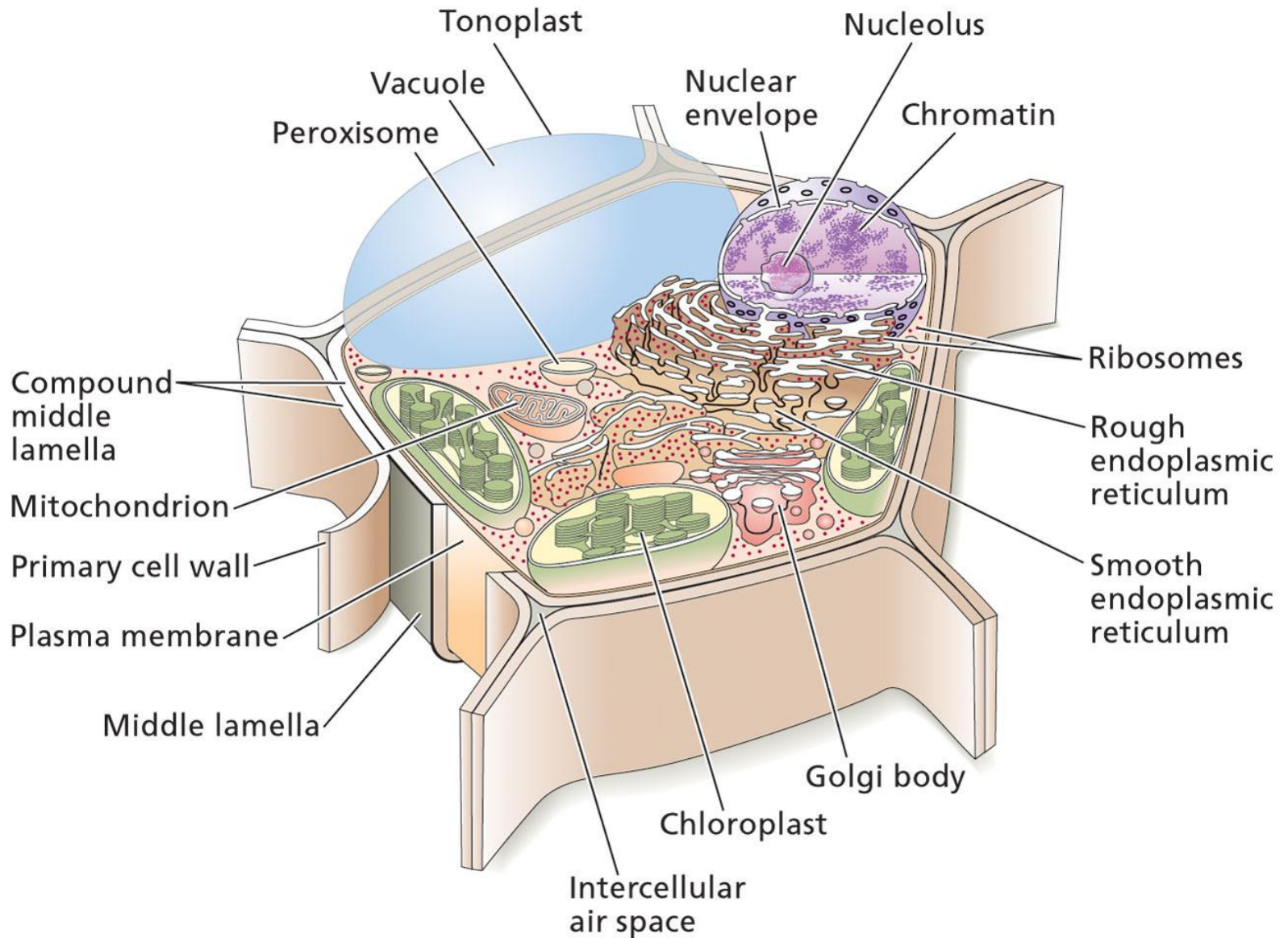


B. LIGHT MICROSCOPE IMAGE

C. ELECTRON MICROSCOPE IMAGE

DNA → RNA → Protein (Enzymes, structural, soluble)

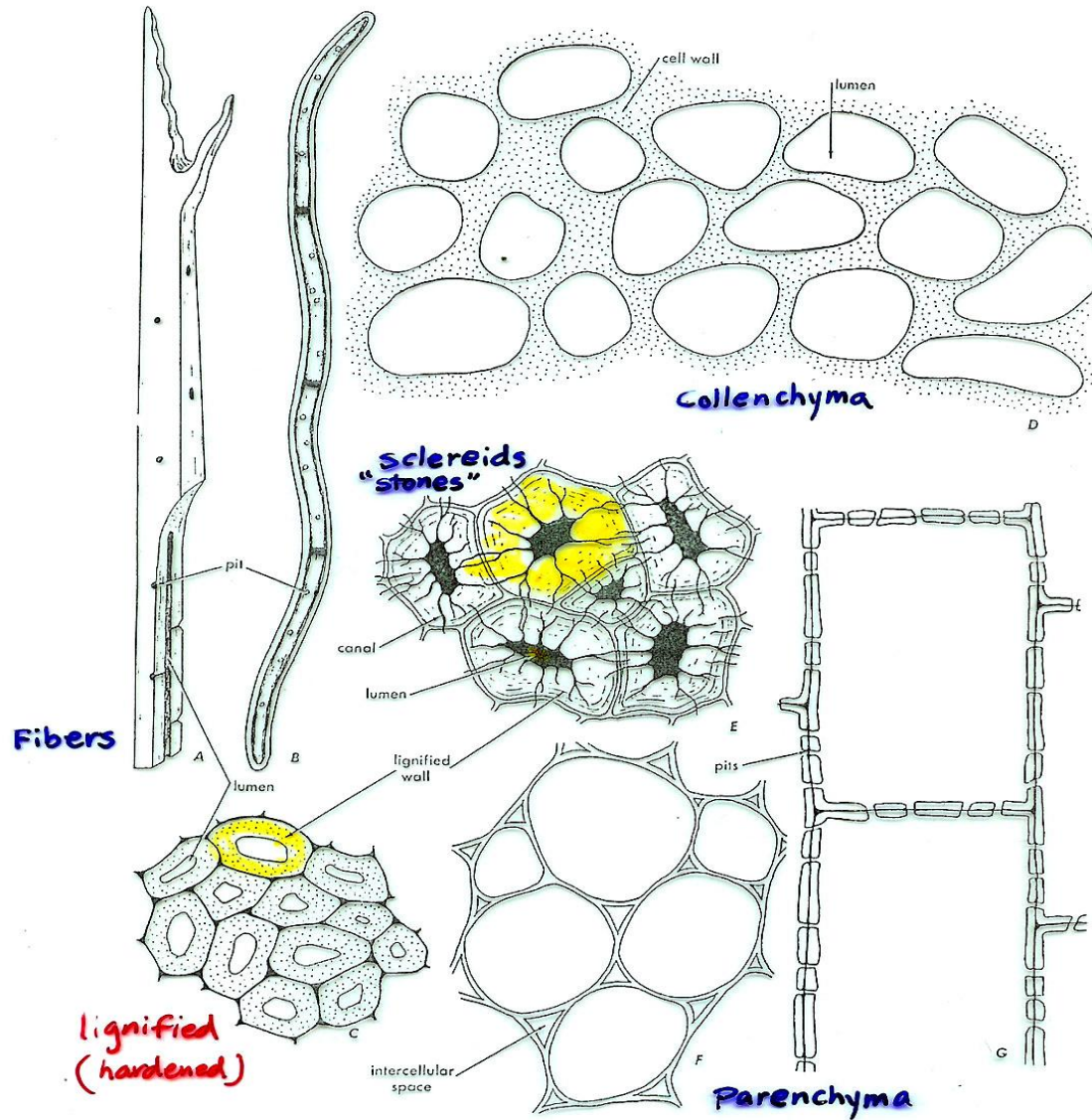
# Components of the Cell





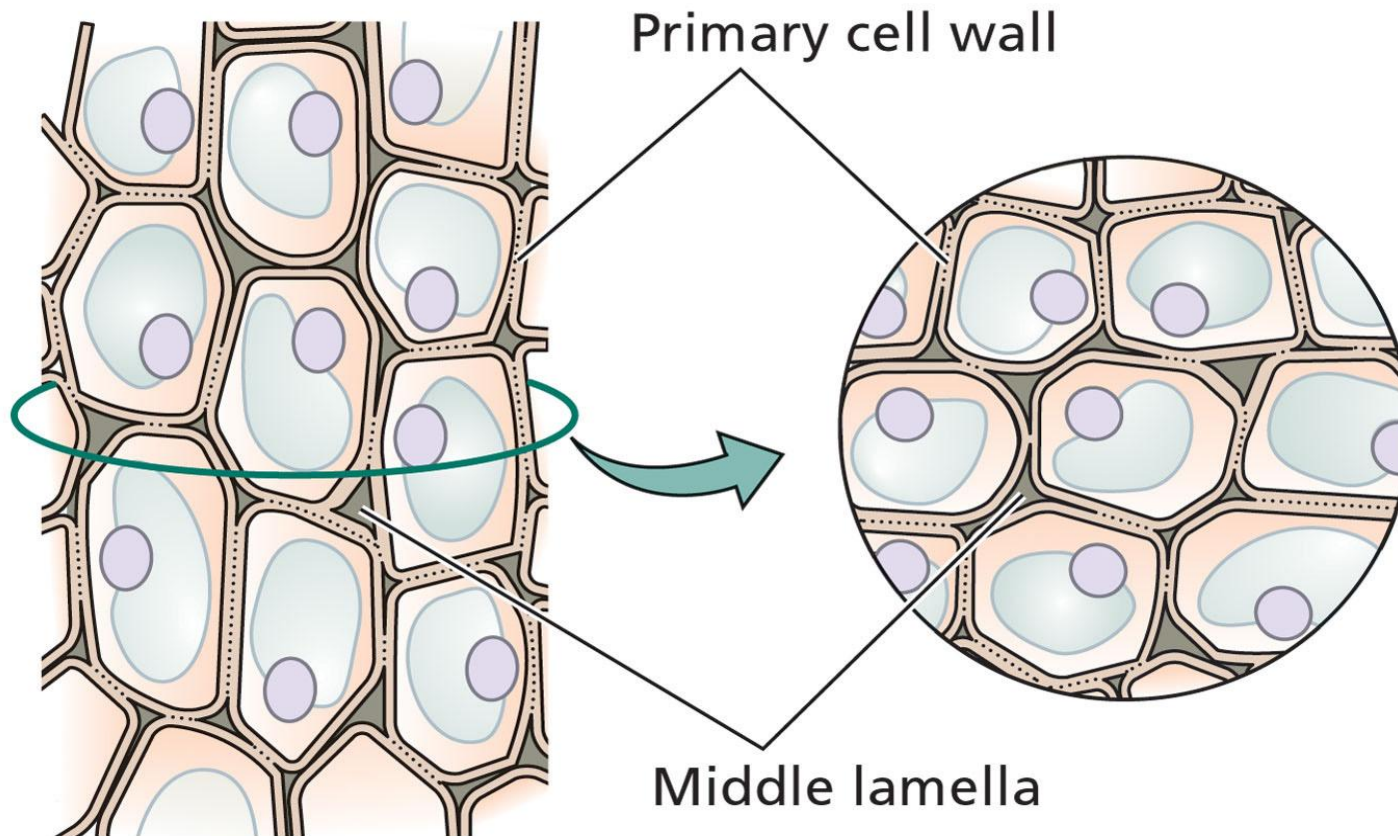
SIMPLE TISSUES

composed of one type of Cell

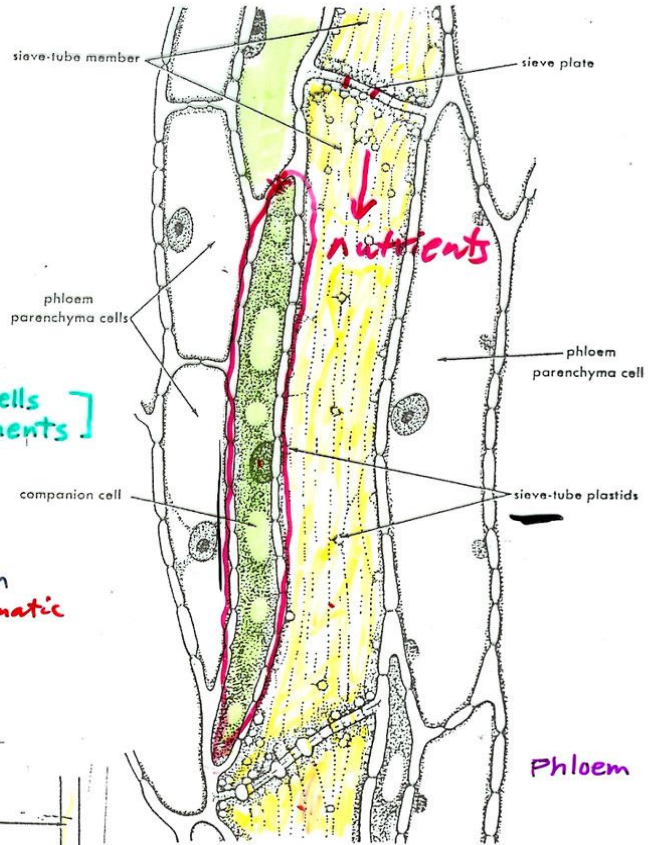
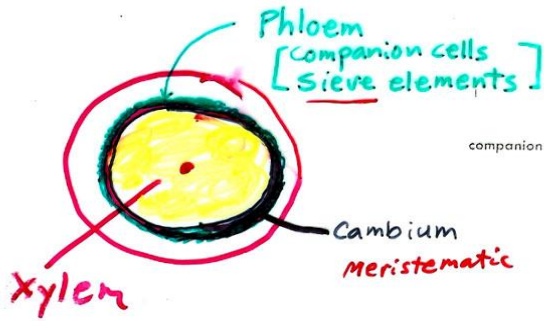


Cell types and tissues. A and B, fibers in lengthwise view; C, fibers in cross section; D, collenchyma; E, sclereids (stone cells); F and G, parenchyma. (A and B redrawn from Forsaith.)

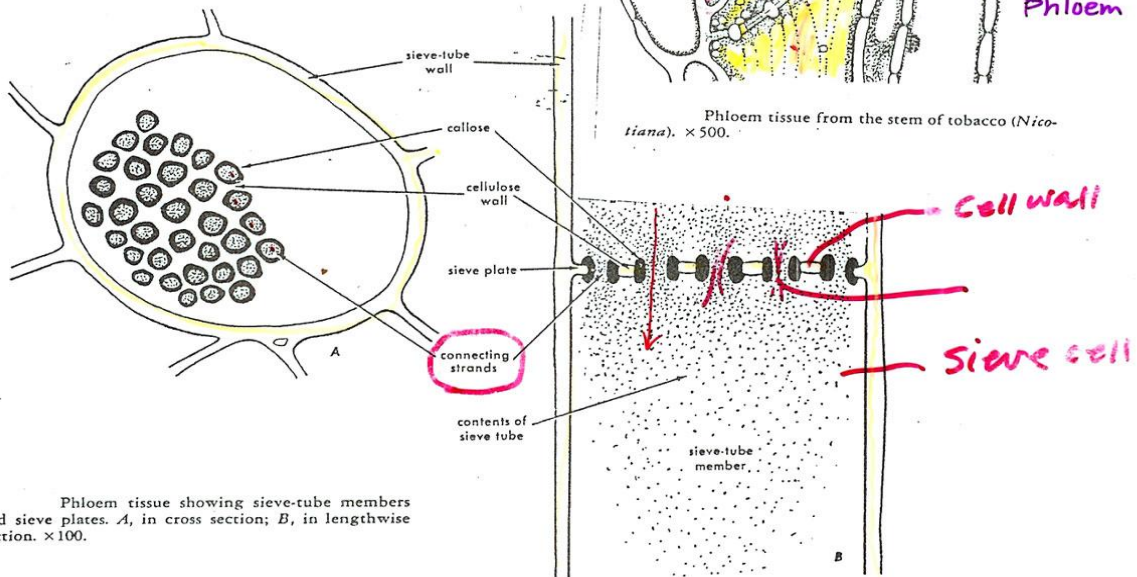
(B) Ground tissue: parenchyma cells



PHLOEM TISSUES



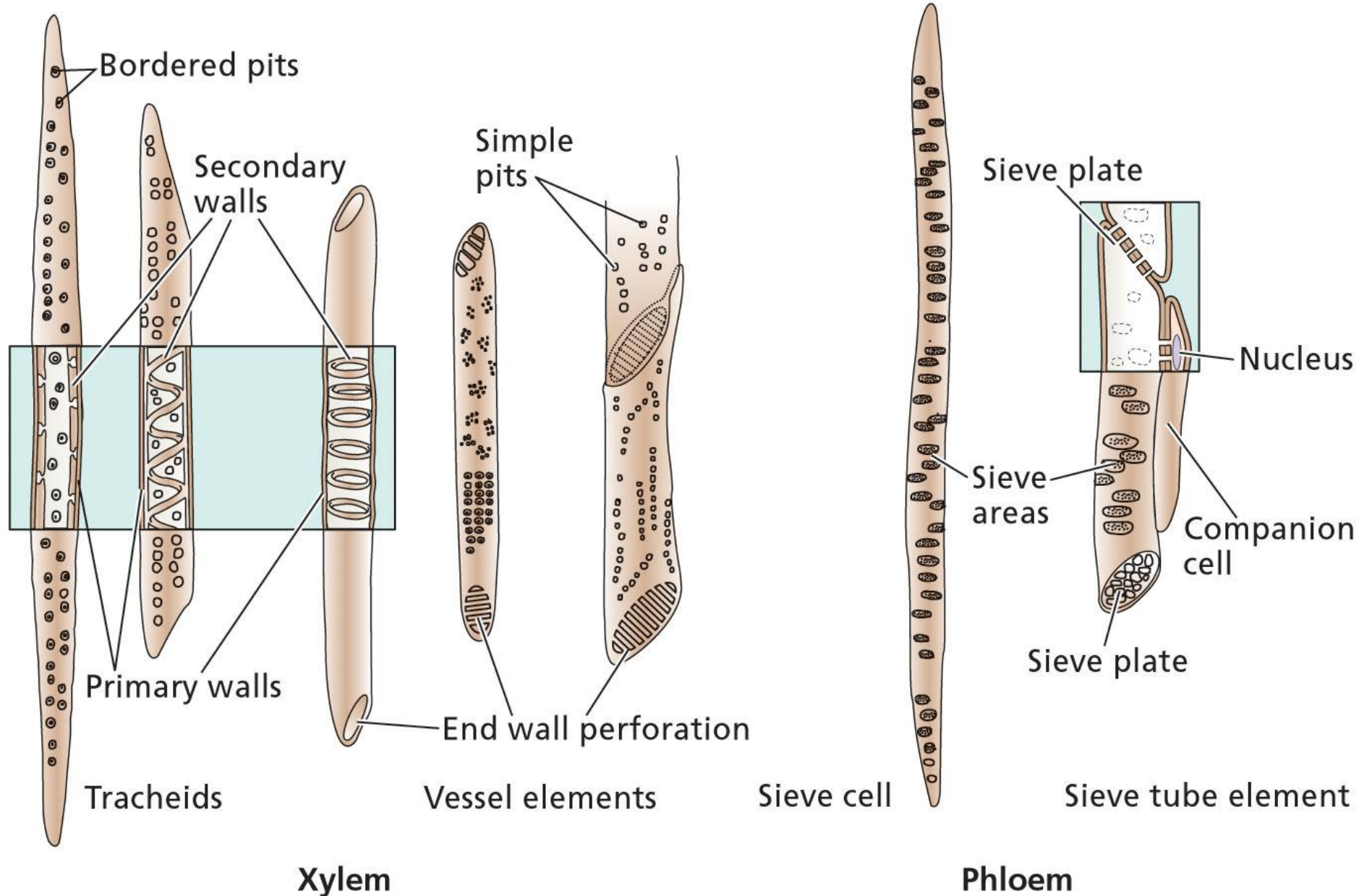
Phloem tissue from the stem of tobacco (*Nicotiana*).  $\times 500$ .

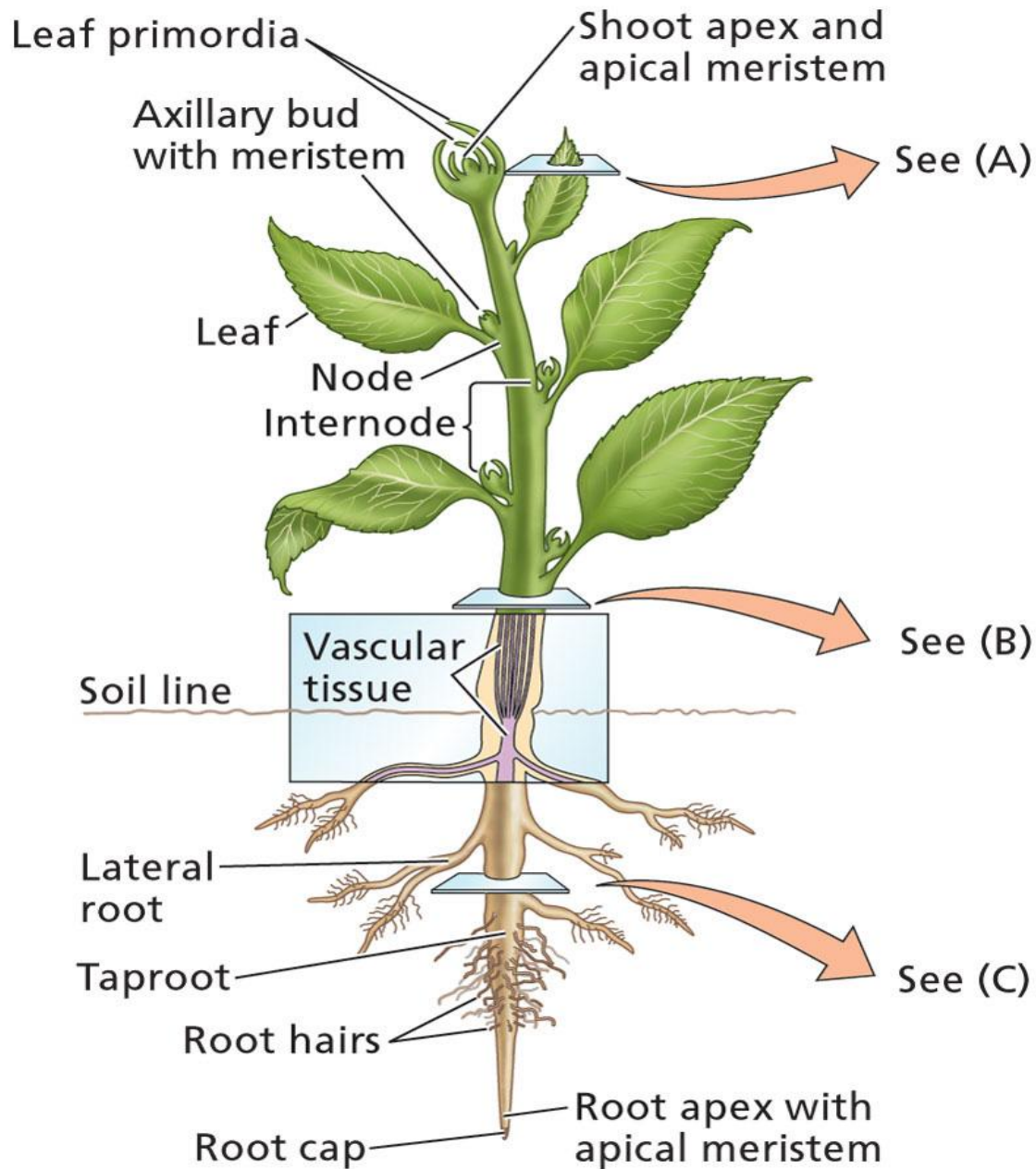


Phloem tissue showing sieve-tube members and sieve plates. A, in cross section; B, in lengthwise section.  $\times 100$ .



(E) Vascular tissue: xylem and phloem

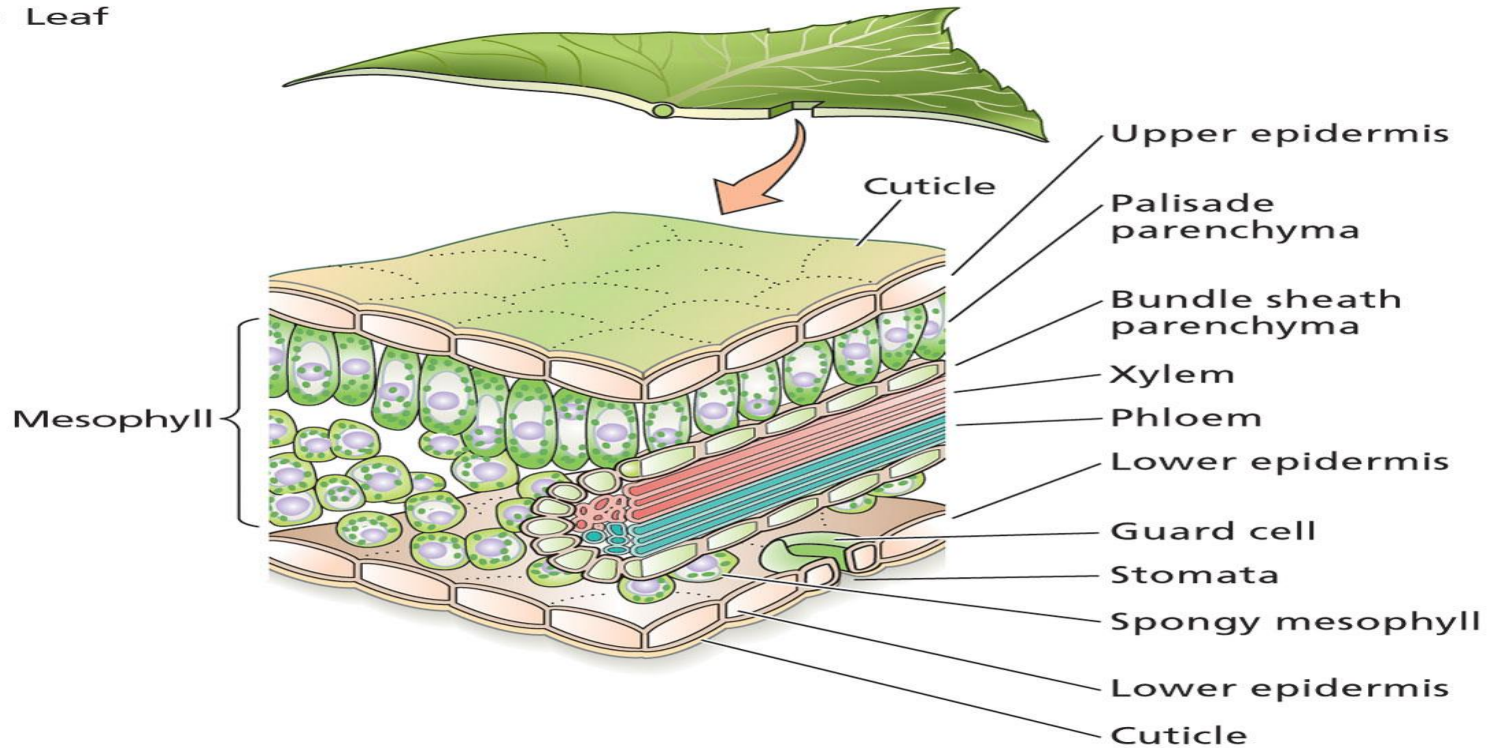




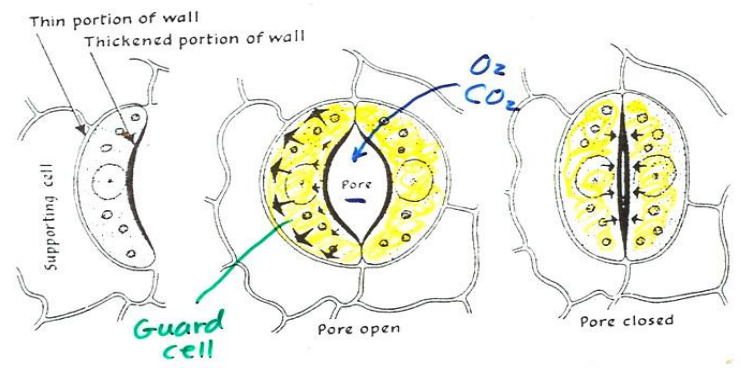
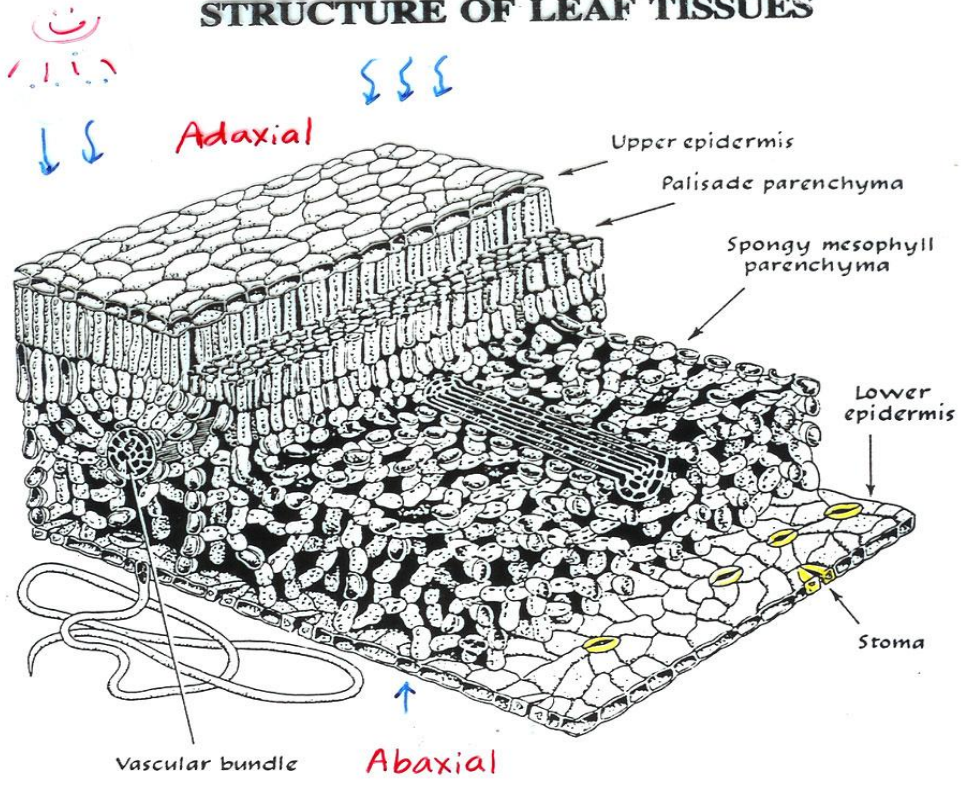


# Leaf Tissues

(A) Leaf

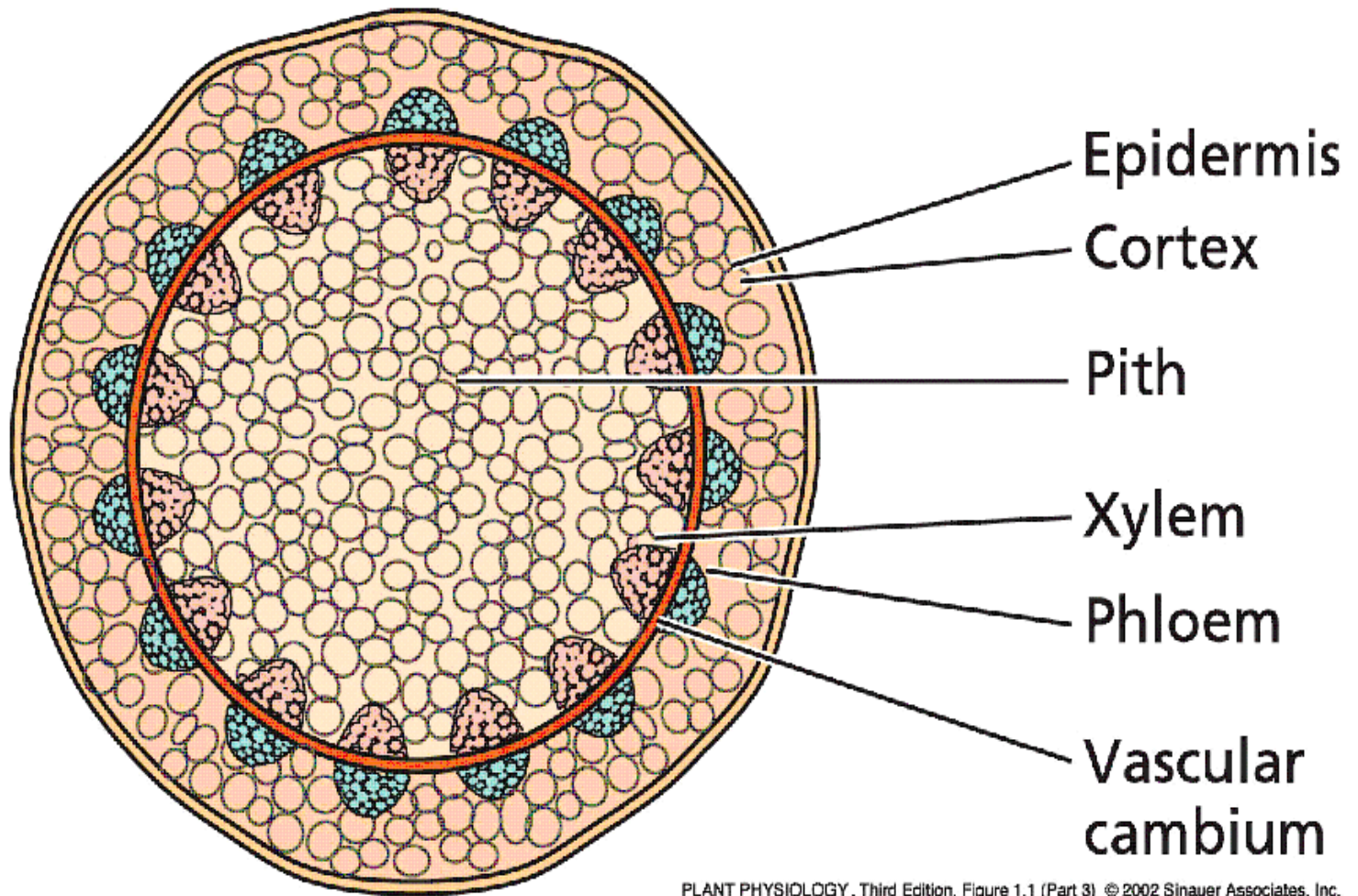


# STRUCTURE OF LEAF TISSUES



# Cross Section of a Stem

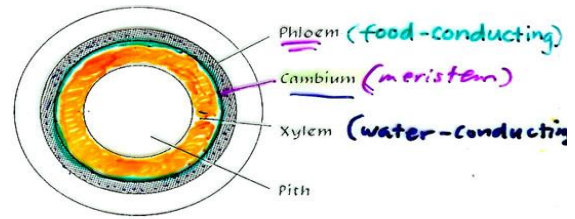
Stem



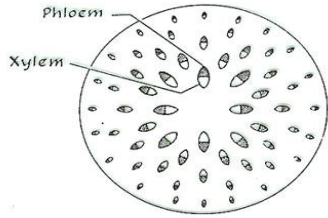


THE PLANT STRUCTURE

Vascular tissue  
= Xylem + phloem



Continuous vascular system of a dicotyledonous stem.



Discontinuous vascular system of a monocotyledonous stem. Note lack of distinct pith.

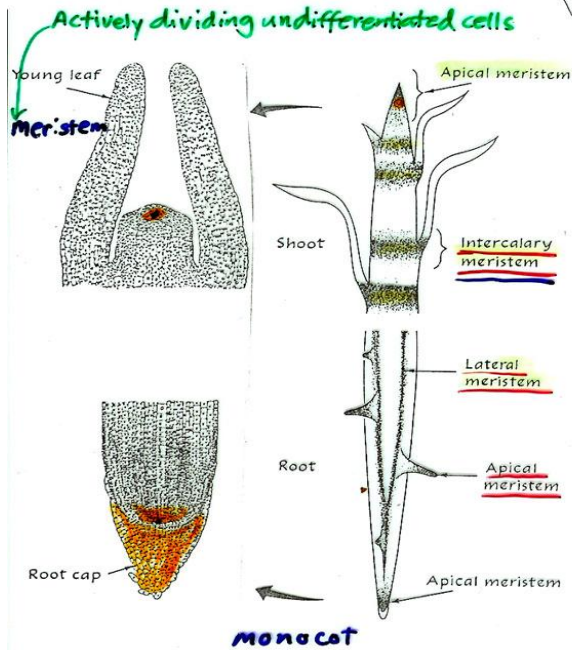


FIGURE 3-6. Diagrammatic longitudinal section of a grass plant, showing the location of the meristems. These shaded areas are the youngest parts of the plant. [Adapted from A. J. Eames and L. H. MacDaniels, *An Introduction to Plant Anatomy*, McGraw-Hill, 1947.]

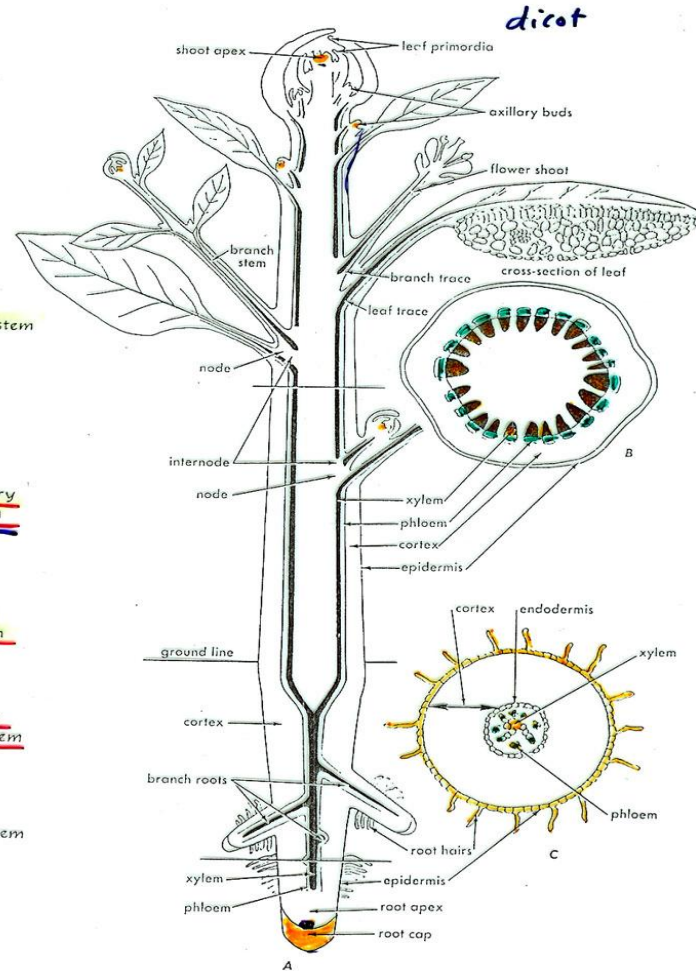
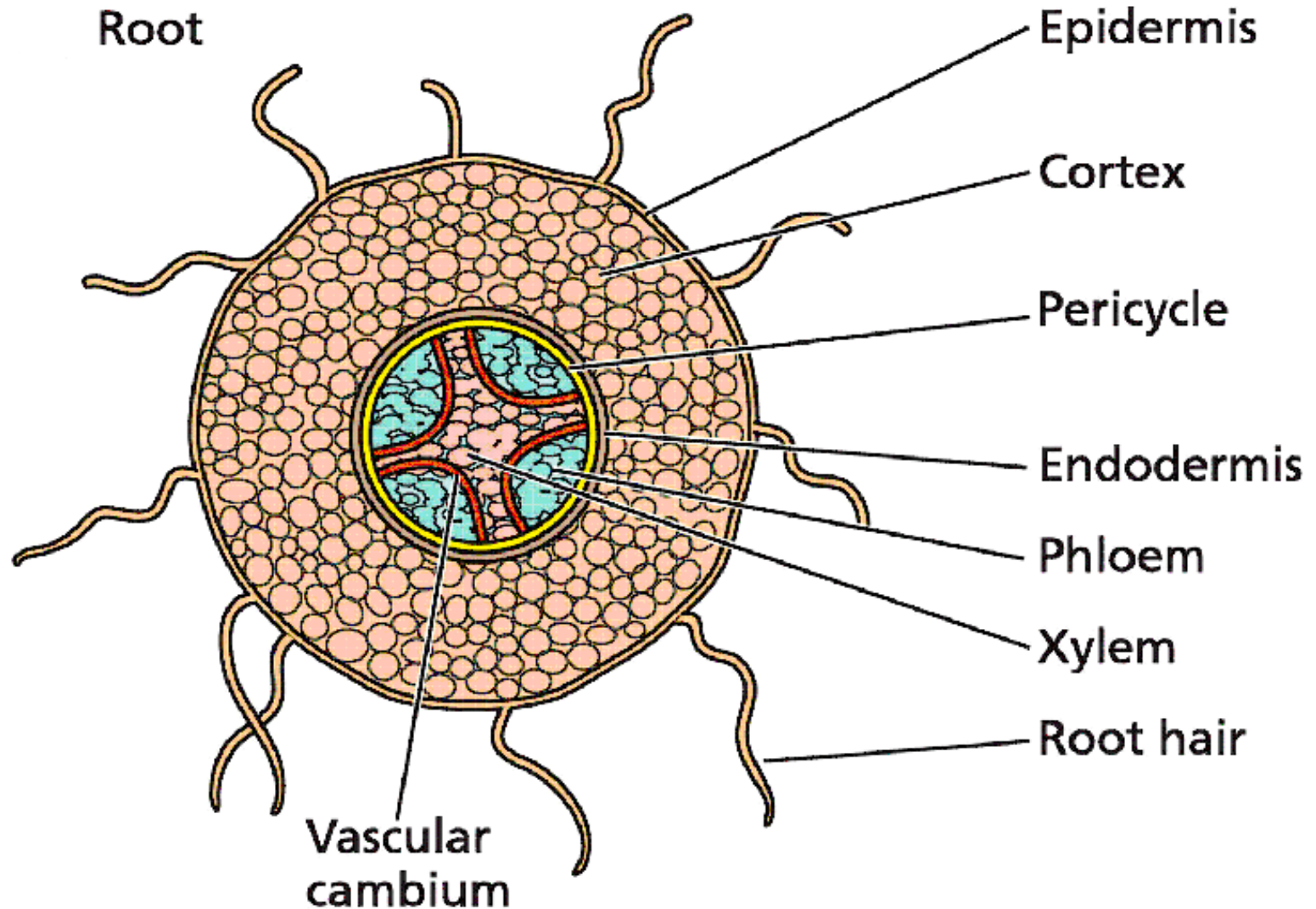
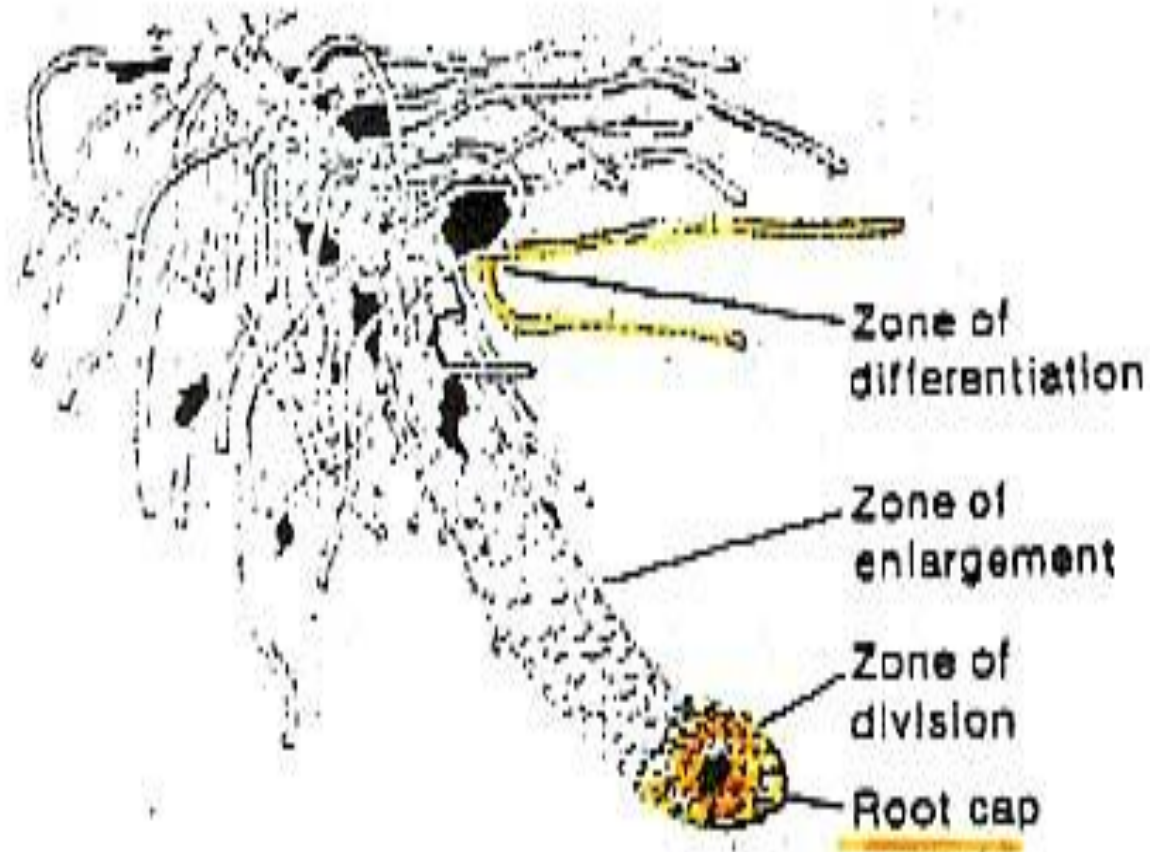


Fig. 3.2. Diagram A, showing the principal organs and tissues of the body of a seed plant; B, cross section of stem; C, cross section of root. (A redrawn from Holman and Robbins, *A Textbook of General Botany*, John Wiley & Sons, Inc.)

# Cross Section of the Root



# Root Tip and Root Hairs

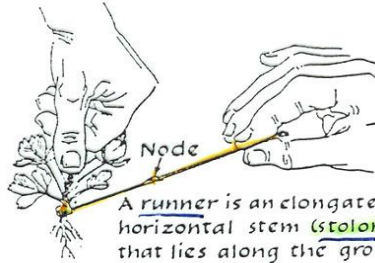




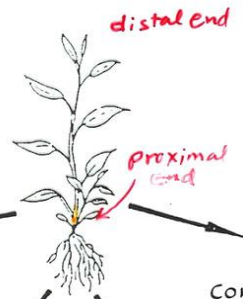
# STEM MODIFICATIONS

## ABOVE GROUND MODIFICATIONS

A **crown** is a compressed stem. **base**



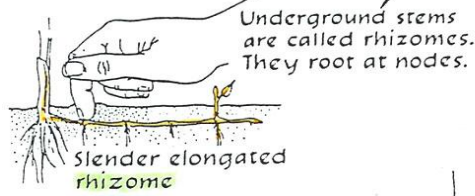
A **runner** is an elongated horizontal stem (**stolon**) that lies along the ground.



Compressed stem of woody stem adapted for fruit production is called a **spur**.

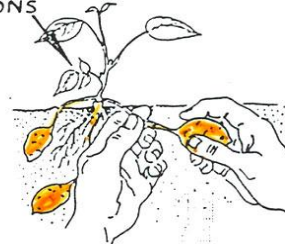


## BELOW GROUND MODIFICATIONS



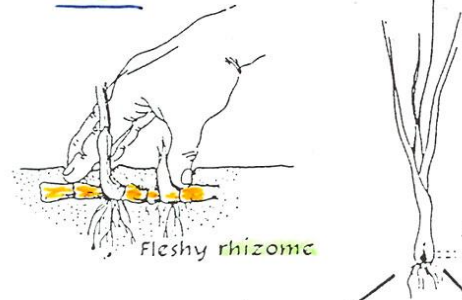
Underground stems are called **rhizomes**. They root at nodes.

Slender elongated **rhizome**



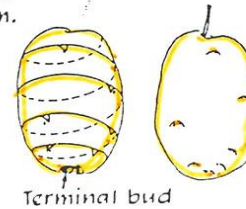
A **tuber** is an enlarged portion of an underground stem.

Note spiral arrangement of "eyes" of potato tuber as in stem.

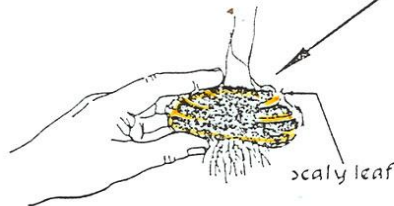


Fleshy **rhizome**

Short stem of a **monocot**

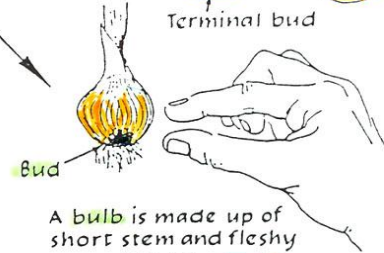


Terminal **bud**



**Corm** is largely compressed stem with reduced scaly leaves.

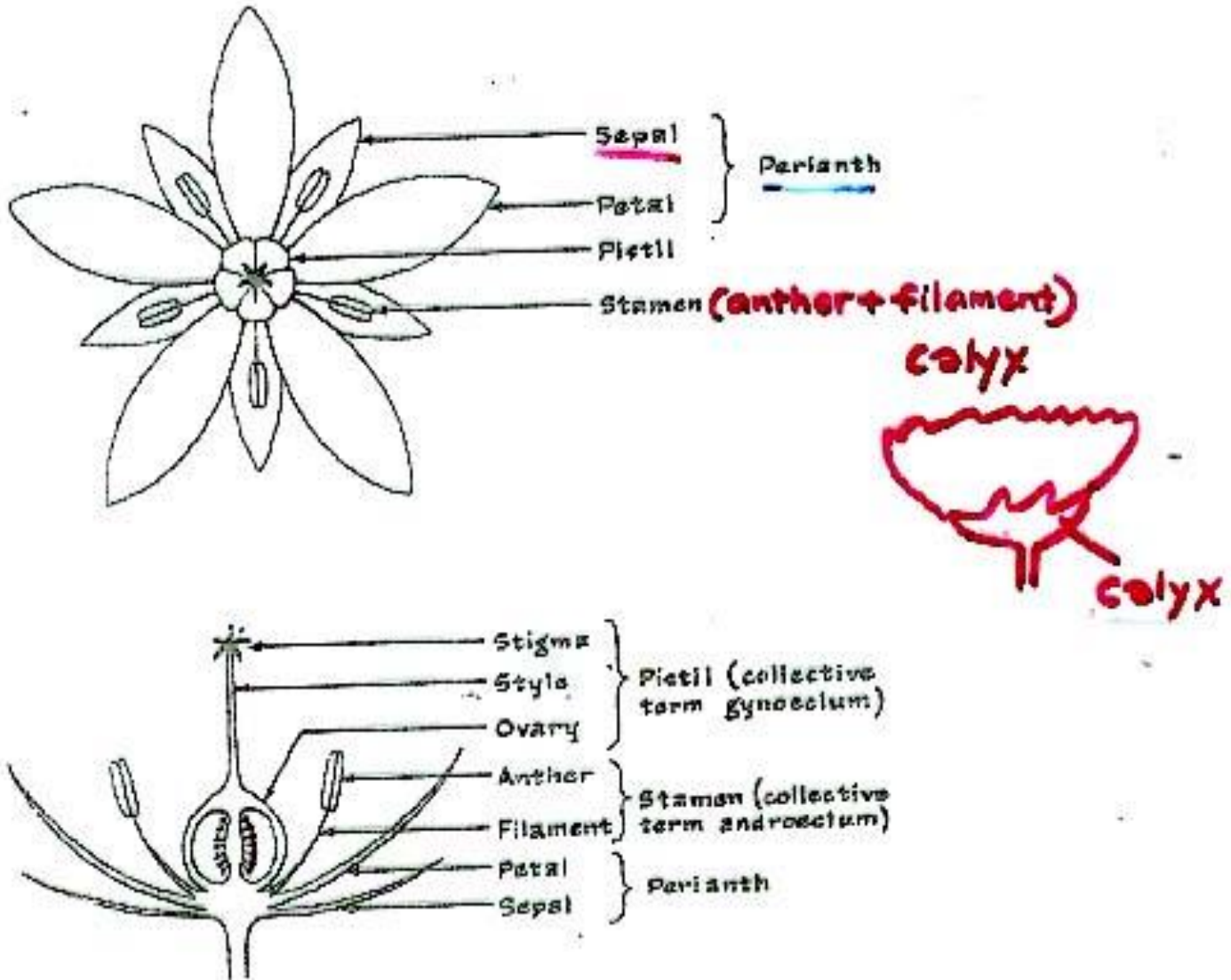
**Gladiolus**



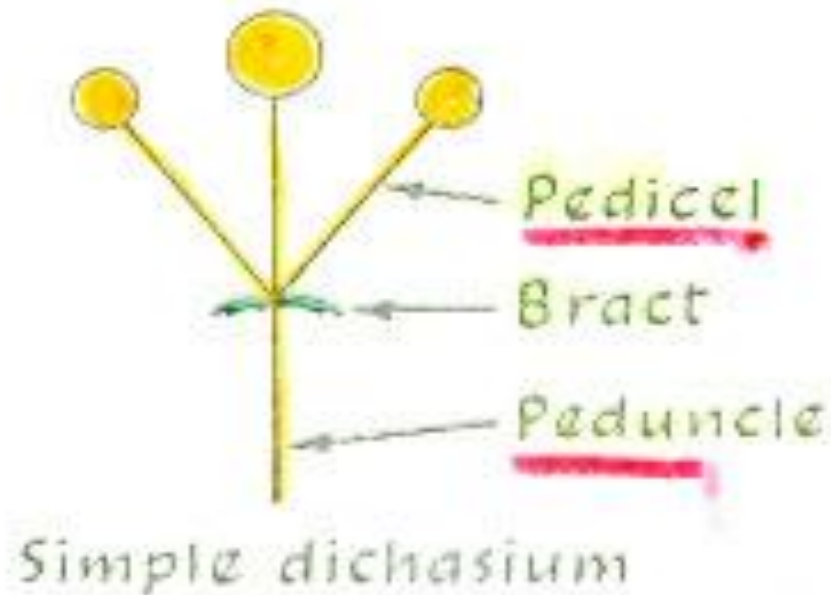
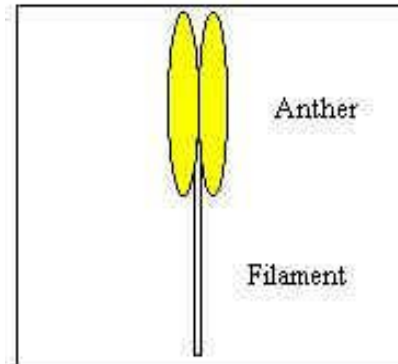
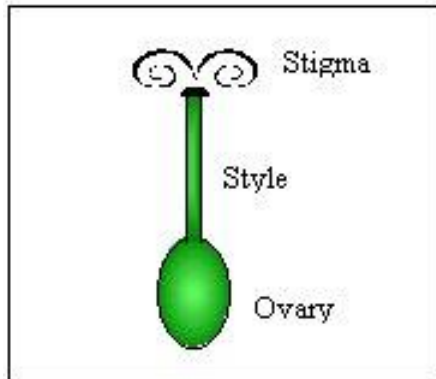
**Bud**

A **bulb** is made up of short stem and fleshy leaves.

# Structure of the Flower



# Flower Structure





# Classification by Number of Petals

Dicots: 4-merous, 5-merous

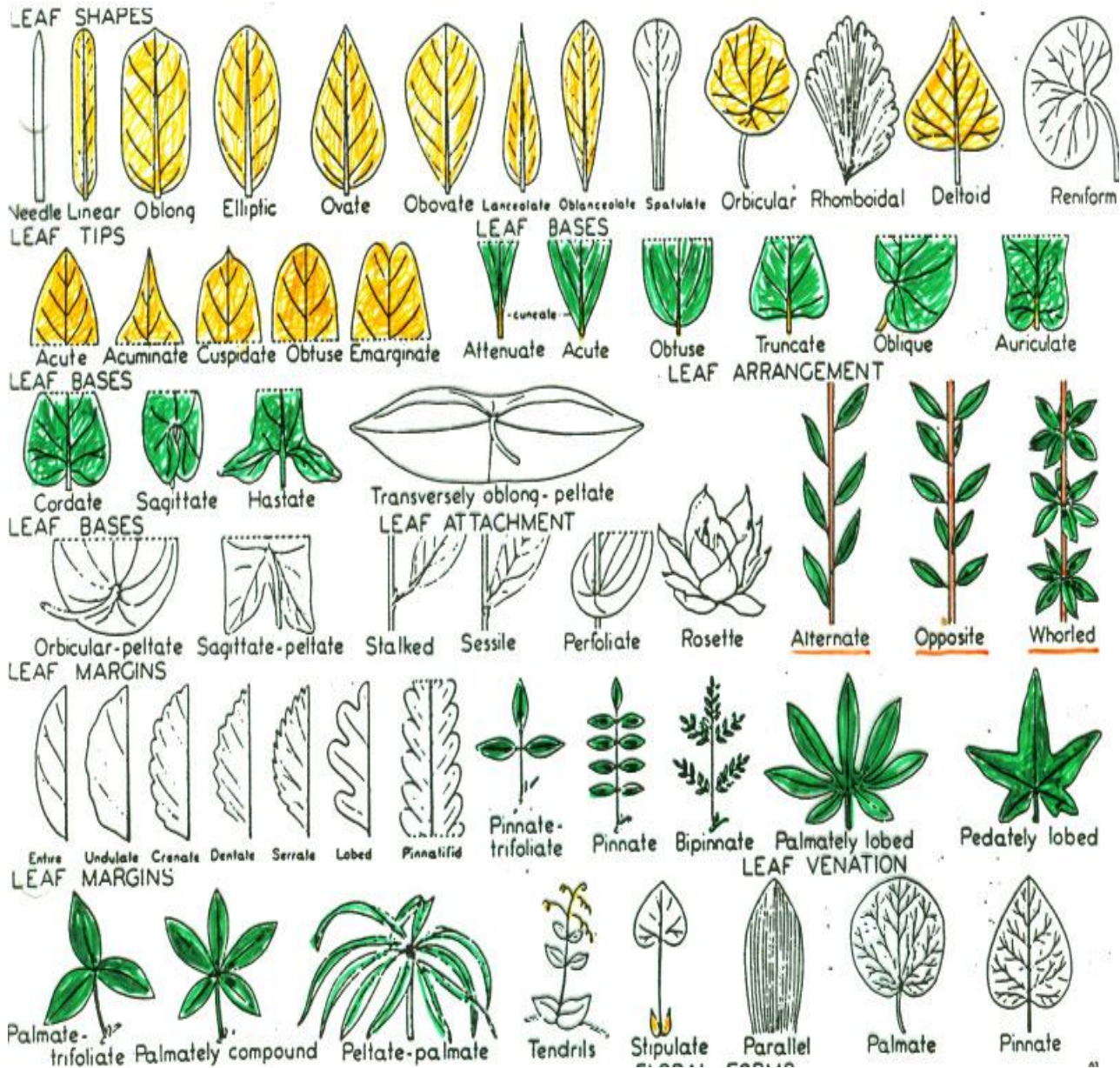
Monocots: 3-merous



Dicot flowers

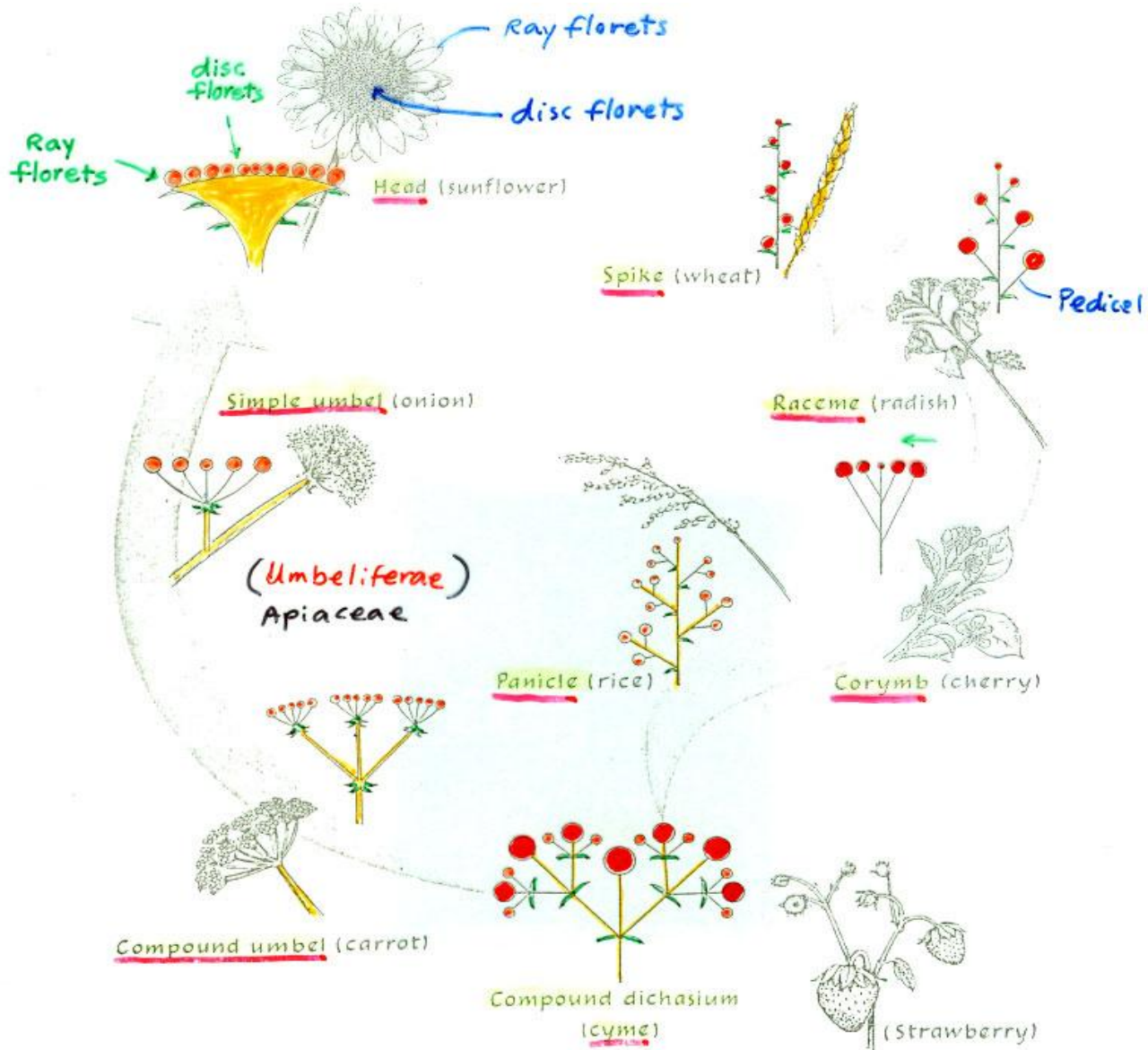
Monocot Flowers

# Leaf Morphology





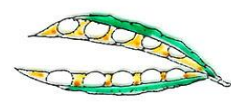
# Types of Inflorescence



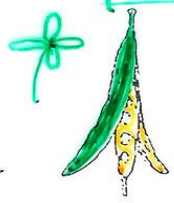
A. SIMPLE FRUITS

FRUIT TYPES

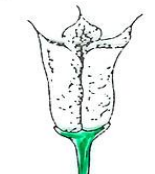
DRY  
Dehiscent



Pod of pea



Silique of crucifer



Follicle of larkspur



Capsule of Jimson weed

2 winged = schizocarp

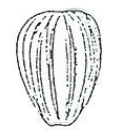
Nondchiscent



Samara of maple



Caryopsis of maize



Achene of sunflower



Schizocarp of carrot

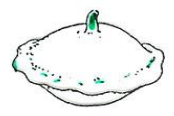


Nut (acorn) of oak

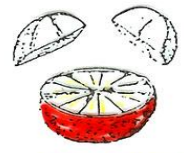
FLESHY



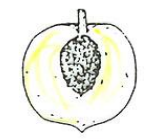
Berry of tomato



Pepo of squash



Hesperidium of orange

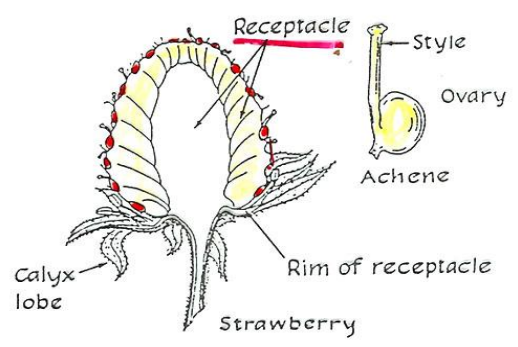


Stone or drupe of peach

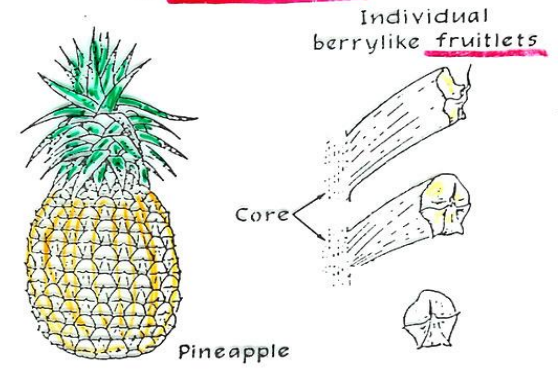


Pome of apple

B. AGGREGATE FRUITS

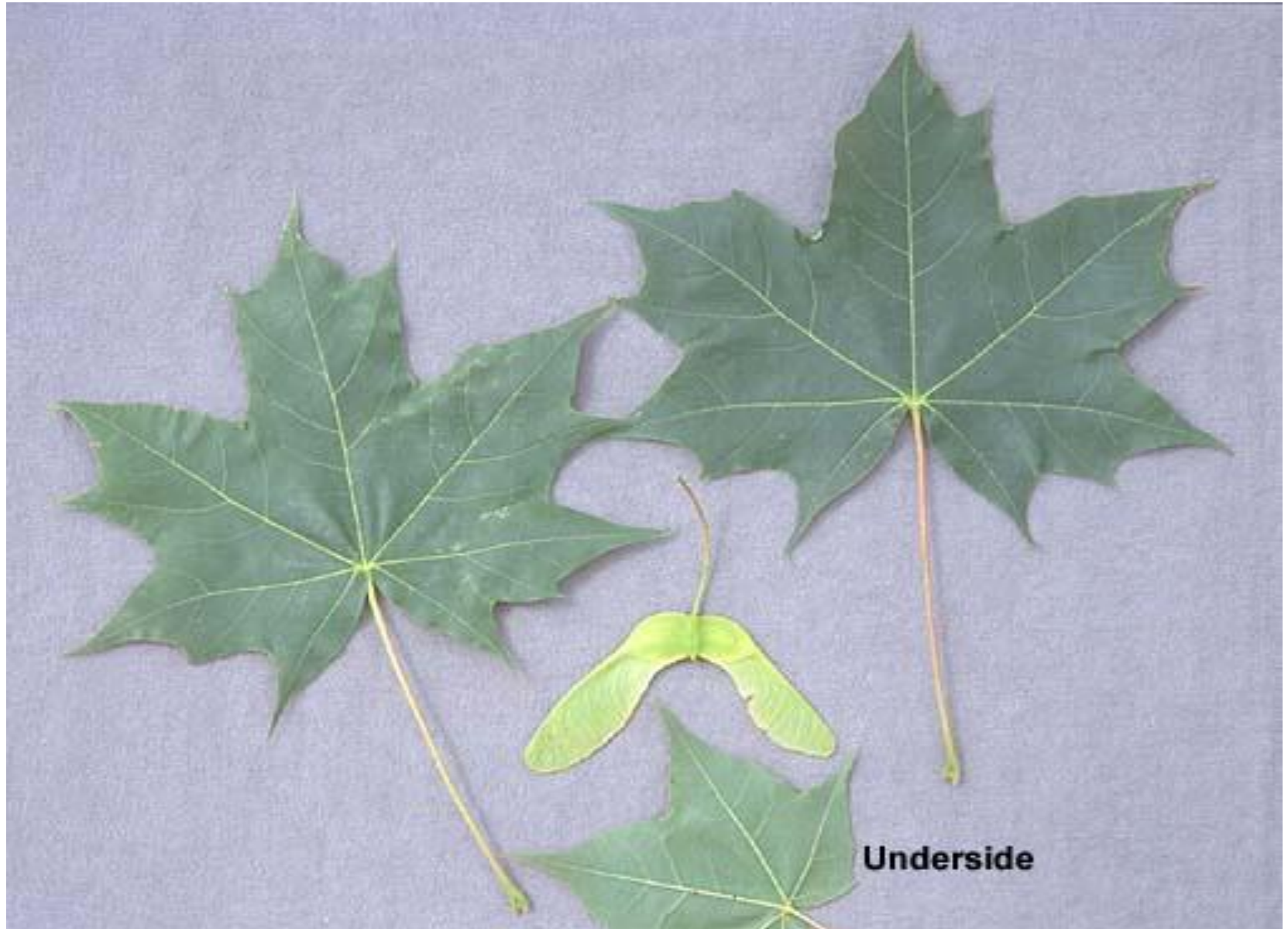


C. MULTIPLE FRUITS





# Samara - Schizocarp



Underside

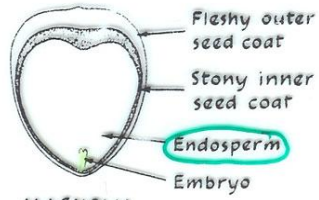


# Silique in Crucifers

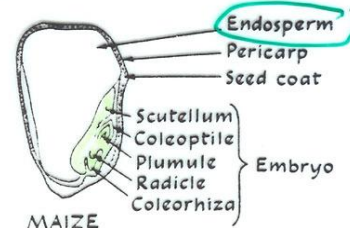




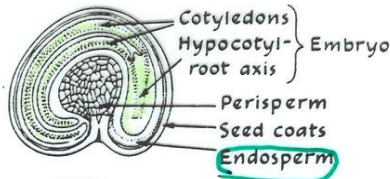
# STRUCTURE OF SEEDS



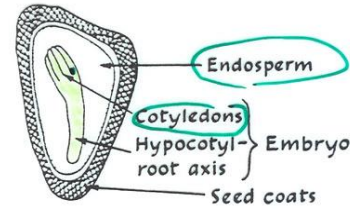
MAGNOLIA



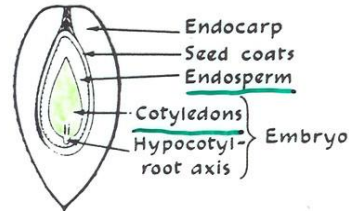
MAIZE



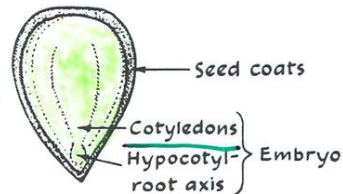
BEET



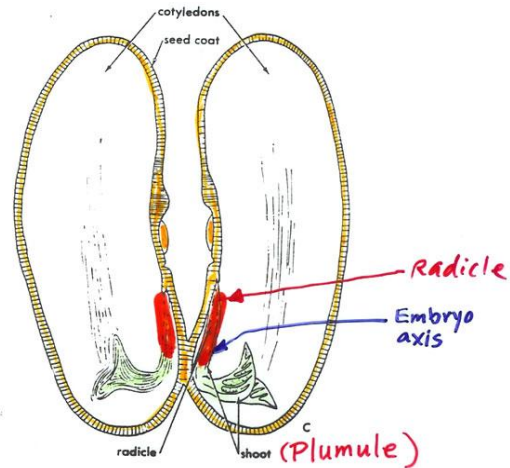
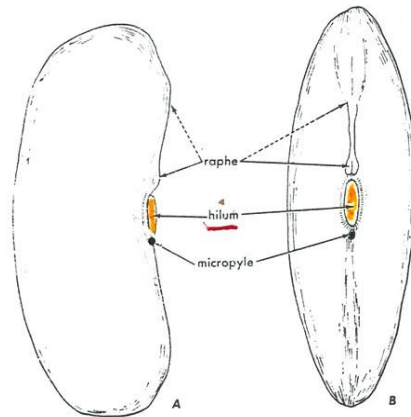
FIR



OLIVE

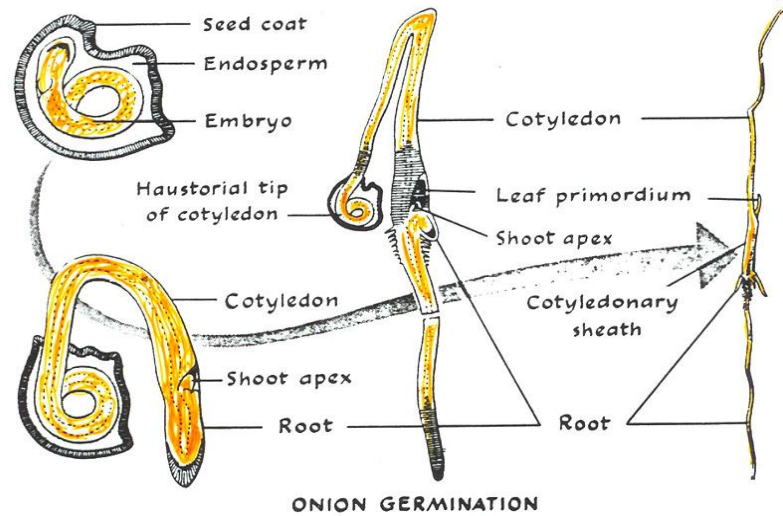
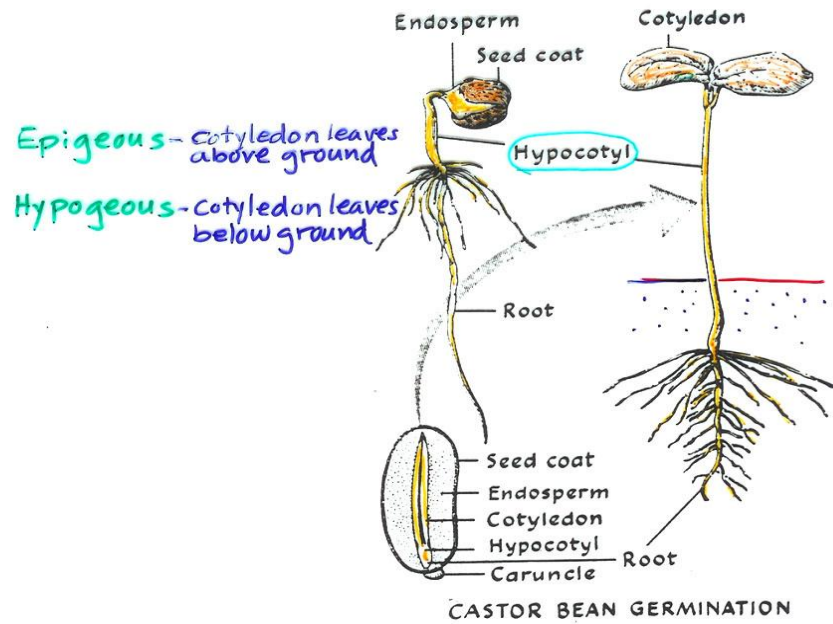


PEAR



Bean seed. A, external side view; B, external face or edge view; C, embryo opened.

# SEED GERMINATION





# Flower Sex Expression





## *Flower Types*

- **Staminate Flower – Male Flower**
- **Pistillate Flower – Female Flower**
- **Hermaphroditic Flower (Perfect flower)**  
Male and female parts together in a single flower



# Flower Sex Expression

## *Plant Types*

- **Monoecious** - Plants carrying both male and female flowers the same plant (**cucumber, corn**)  

- **Dioecious** - Species in which separate male (staminate) and female (pistillate) plants exist (**Date palm, papaya, spinach, hemp, ginkgo**)  

- **Andromonoecious** - Plants carrying both male and perfect flowers the same plant (**muskmelon**)  

- **Gynomoecious** - Plants carrying both female and hermaphroditic flowers on the same plant (**some cucurbits**)  

- **Trimonoecious** - Plants carrying male, female, and hermaphroditic flowers on the same plant (**some cucurbits**)  
