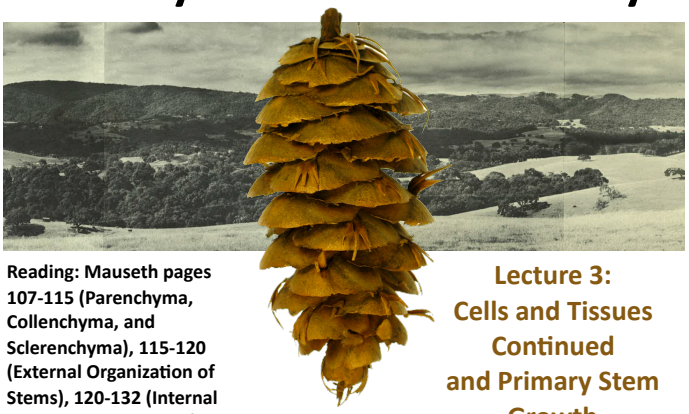
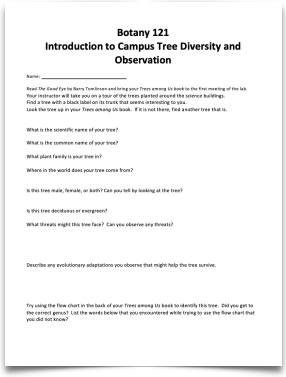
Botany 121: General Botany



Reading: Mauseth pages 107-115 (Parenchyma, Collenchyma, and Sclerenchyma), 115-120 (External Organization of Stems), 120-132 (Internal Organization of Stems)

Lecture 3: Cells and Tissues Continued and Primary Stem Growth

Due in Lab:



Botany 121
Introduction to Campus Tree Diversity and Observation

Name: _____

Read *The Grand Eye* by Barry Tomlinson and bring your *Trees among Us* book to the first meeting of the lab.
Your instructor will take you on a tour of the trees planted around the science buildings.
Find a tree with a black label on its trunk that seems interesting to you.
Look the tree up in your *Trees among Us* book. If it is not there, find another tree that is.

What is the scientific name of your tree?

What is the common name of your tree?

What plant family is your tree in?

Where in the world does your tree come from?

Is this tree male, female, or both? Can you tell by looking at the tree?

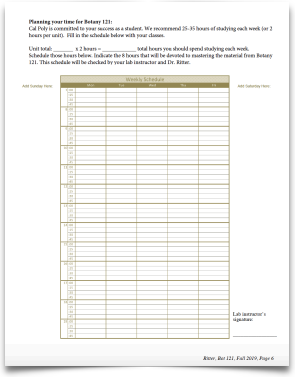
Is this tree deciduous or evergreen?

What threats might this tree face? Can you observe any threats?

Describe any evolutionary adaptations you observe that might help the tree survive.

Try using the flow chart in the back of your *Trees among Us* book to identify this tree. Did you get to the correct genus? List the words below that you encountered while trying to use the flow chart that you did not know?

10 points



Planning your time for Botany 121:
Cal Poly is committed to your success as a student. We recommend 25-35 hours of studying each week (or 2 hours per unit). Fill in the schedule below with your classes.

Unit total: _____ x 2 hours = _____ total hours you should spend studying each week.
Schedule those hours below. Indicate the 8 hours that will be devoted to mastering the material from Botany 121. This schedule will be checked by your lab instructor and Dr. Ritter.

Week's Schedule

	Mon	Tue	Wed	Thu	Fri
Add Sunday Here:					Add Saturday Here:
6					
7					
8					
9					
10					
11					
12					
1					
2					
3					
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Lab instructor's signature: _____

Ritter, Bot 121, Fall 2009, Page 6

5 points

Advice from the College of Science and Math Dean

- Deep learning takes time. 25-35 works!
- Go to office hours; get to know your professors
- Study without distractions
- Find meaning in your courses by connecting to the passion of your professors
- Avoid boom and bust studying; 5 hours over 5 days is better than 5 hours in one study session

Advice from the College of Science and Math Dean

- Get sleep and exercise!
- Get to know yourself: What works for you, when are you most alert? Work then.
- Learn from your peers.

- The fact that you exist is a miracle. Make the most of it!

Dark Germination

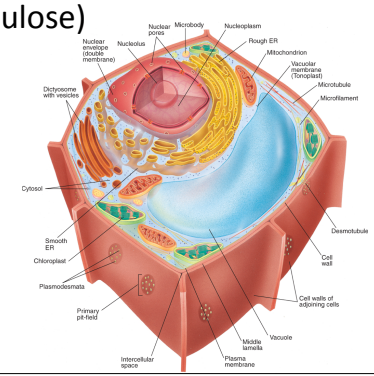
Light Germination

Dark germination then lit from the left side

Corn Light Worshippers

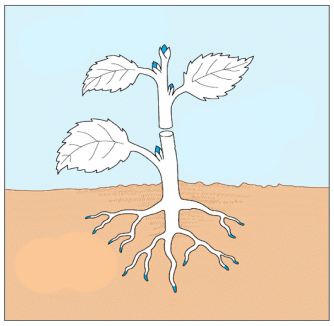
Review of Plant Cells

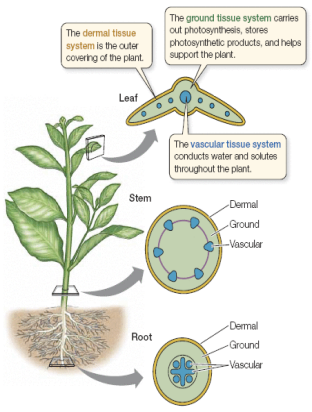
- Eukaryotic cells (with organelles)
- Plant cell walls (cellulose)
- Plasma membrane
- Nucleus
- Chloroplast
- Vacuole



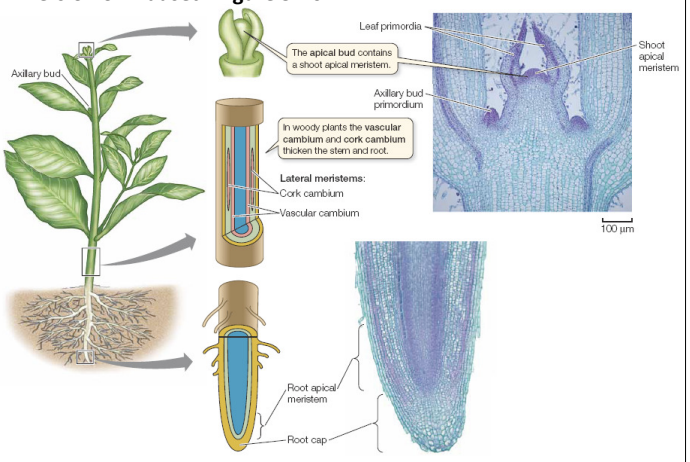
Meristems and Tissues

- Apical and lateral meristems

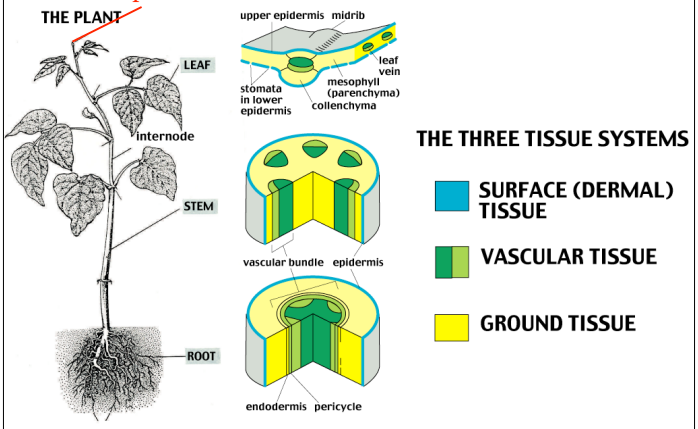




A version of Mauseth Figure 5-40

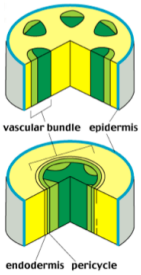


Plant Tissues



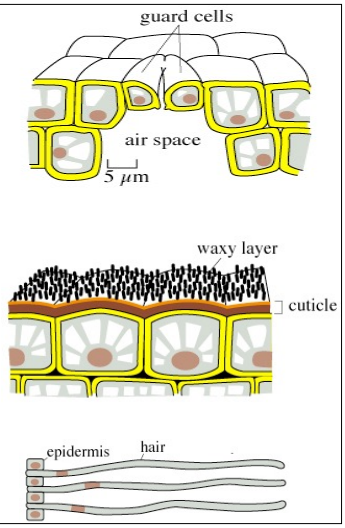
Tissues Overview

- Apical Meristem and Lateral Meristems (vascular cambium and cork cambium)
- 3 Main Tissues:
  - Epidermal (stomata, trichomes)
  - Ground (parenchyma, collenchyma, sclerenchyma [fibers and sclereids])
    - **Called Cortex in Mauseth Book**
  - Vascular (Xylem [tracheids and vessel elements] Phloem [sieve tube members and companion cells])

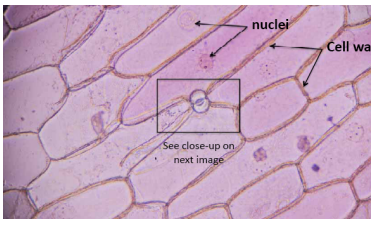


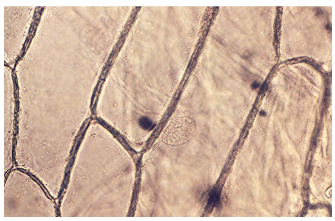
Epidermis

- Outermost layer of cells
- More than one cell type
- Covered with a waxy cuticle layer to prevent water loss
- Guard cells form stomata
- Trichomes - hairs

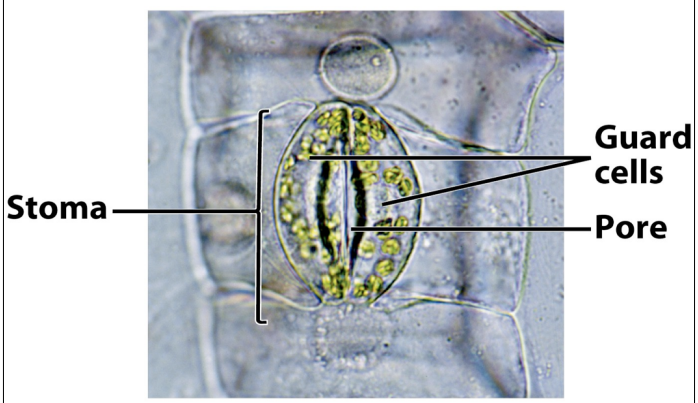


Onion Peel Epidermis

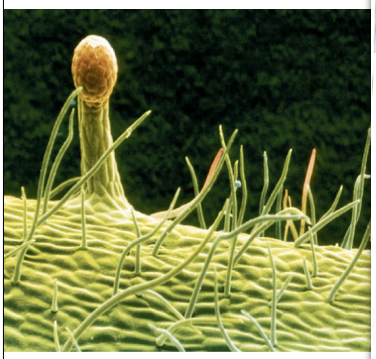


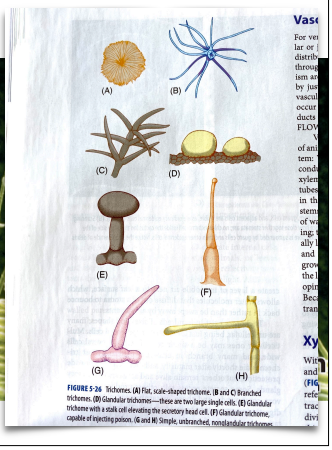


Stomata



Trichomes - Leaf Hairs





Sundews have glandular trichomes that act as fly paper

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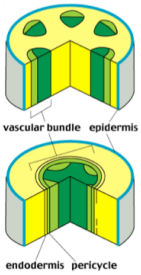
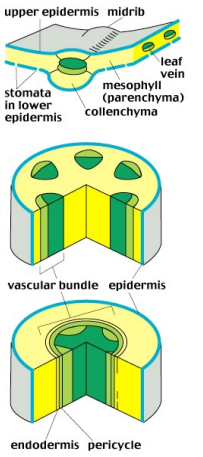
  - Vascular (Xylem [tracheids and vessel elements] Phloem [sieve tube members and companion cells])



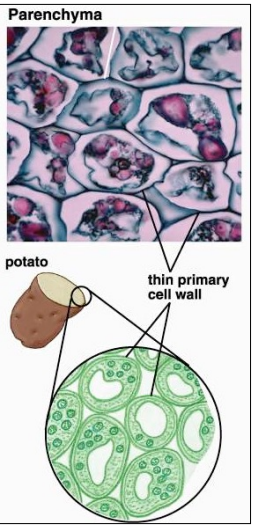
Ground Tissues

- Present in most organs of the plant
- **Simple tissues** are made on one type of cell
- **Complex tissues** are made up of two or more cell types

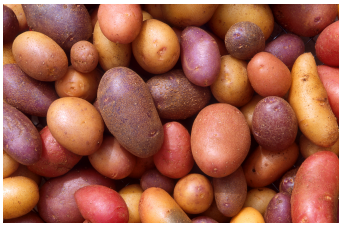


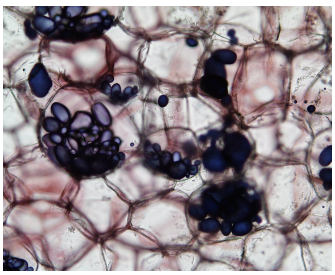
Simple Tissues

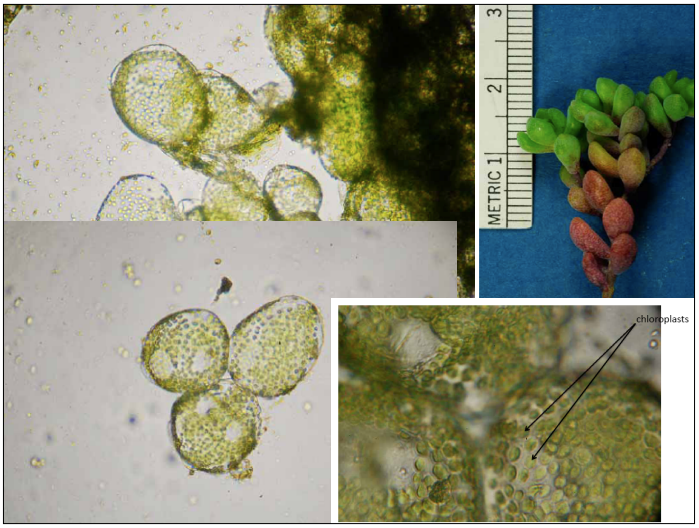
- Parenchyma tissue
- Living at maturity
- Thin primary cell walls
- Large central vacuole
- Can take on many shapes
- Function in photosynthesis, storage, and transport of food and water

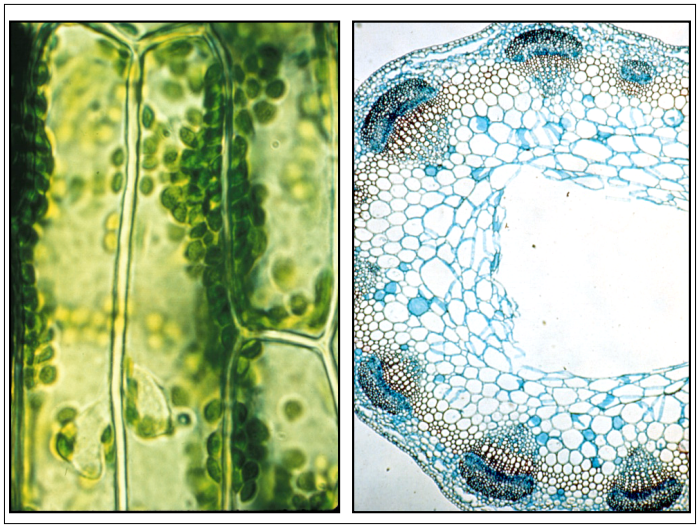


Parenchyma Cells





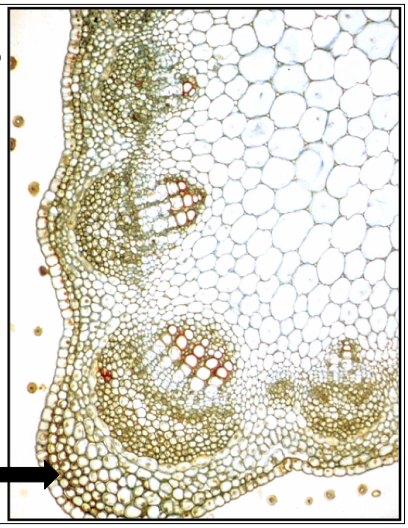




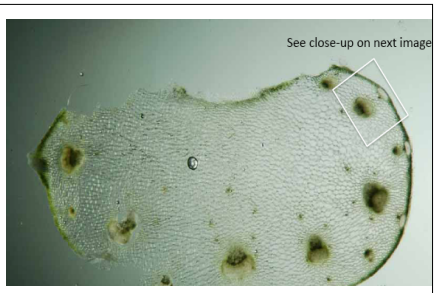
Simple Tissues

- Collenchyma
- Composed of living cells with thick primary cell walls
- Flexible support for organs such as leaves and herbaceous stems

collenchyma



Collenchyma in Celery



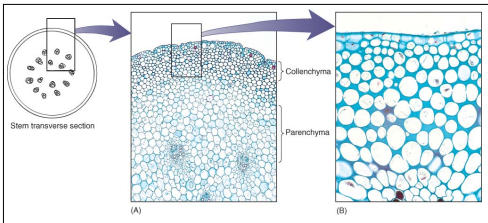
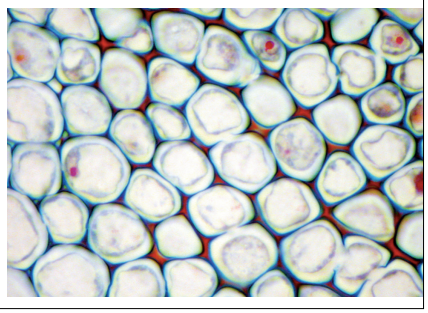
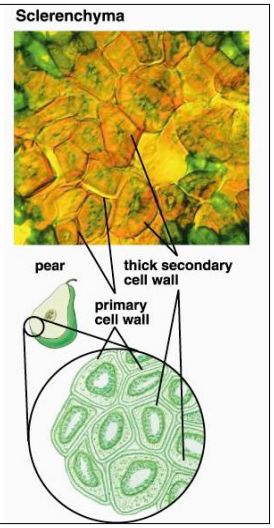


Figure 5-8

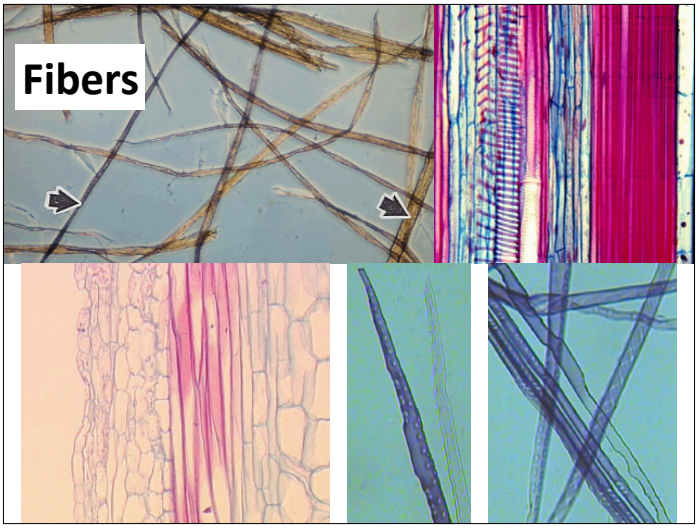


Simple Tissues

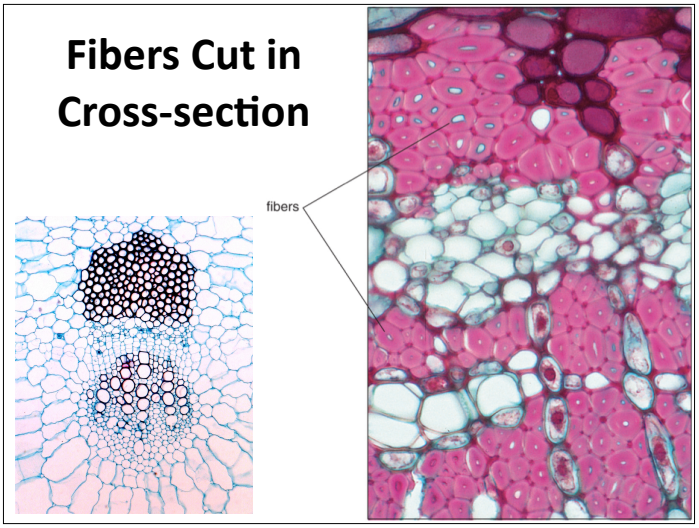
- Sclerenchyma tissue
- Dead at maturity
- Thick and rigid secondary cell walls
- Function in support and protection
- Two types: sclereids and fibers



Fibers

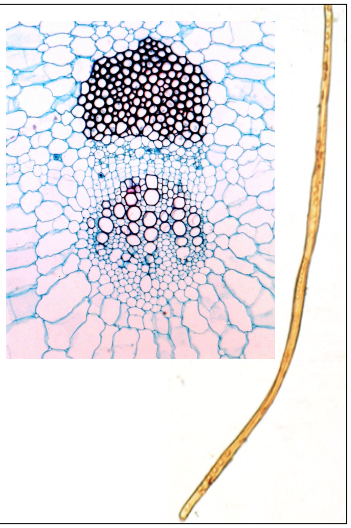


Fibers Cut in Cross-section



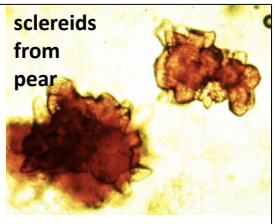
Fibers

- Fibers are elongated sclerenchyma cells that provide structural rigidity and stiffening for leaves, stems, and roots



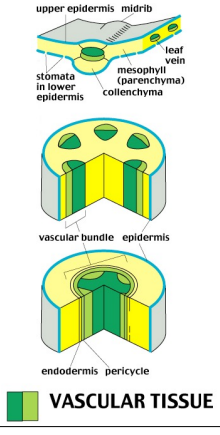
Sclereids

- Sclereids (stone cells) form the hard tissues of nuts, seed coats, etc.
- They may also be present together with thin-walled parenchyma cells.



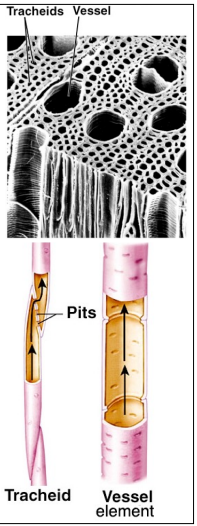
Vascular Tissue

- Continuous tissue throughout the plant in which substances are transported
- Complex tissues, made of numerous cells types
- Xylem and phloem



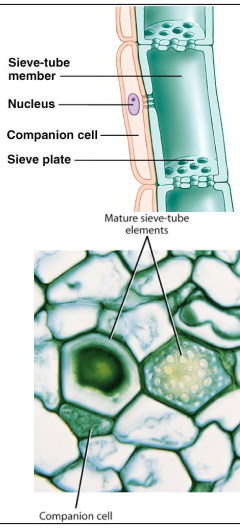
Xylem

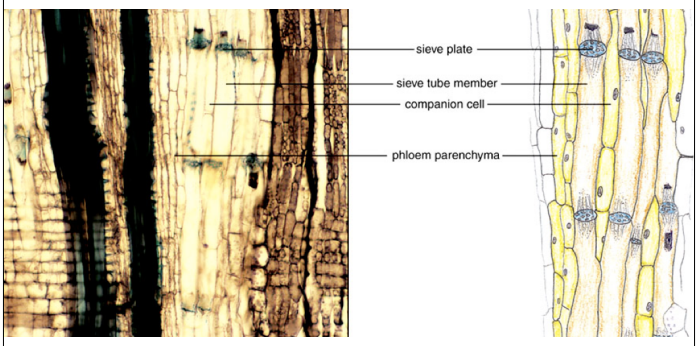
- Function: transports water and mineral salts
- Composed of different types of cells
  - Vessel elements - long tubular cells open at both ends, arranged end to end forming vessels that function like water pipes
  - Tracheids - tapered at the ends but do not have holes at the ends, water passes from tracheid to tracheid through thin areas in the cell wall called pits
  - Xylem fibers
  - Xylem parenchyma



Phloem

- Function: transports sugars and other organic substances
- Composed of different types of cells
  - Sieve tube elements - long tubular cells with sieve plates in the end walls, arranged end to end, alive but lacking a nucleus
  - Companion cells - help sieve tube members function
  - Phloem fibers
  - Phloem parenchyma





Tissues Review

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