

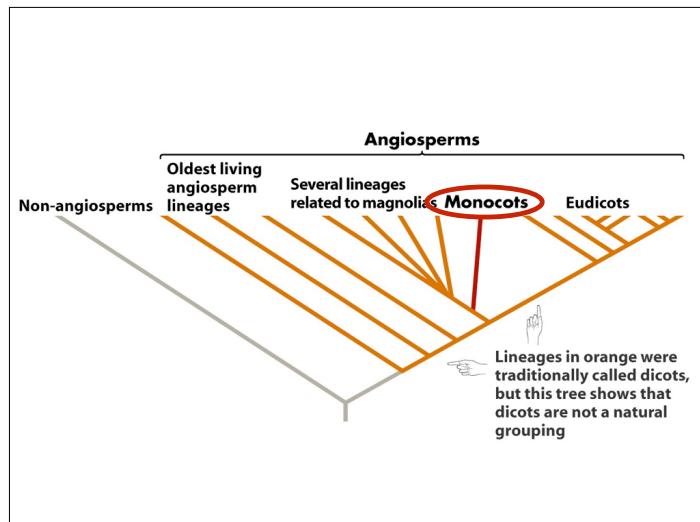
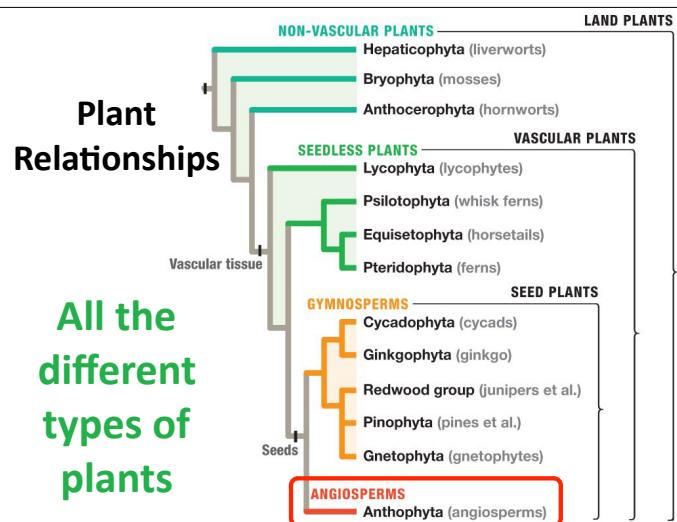
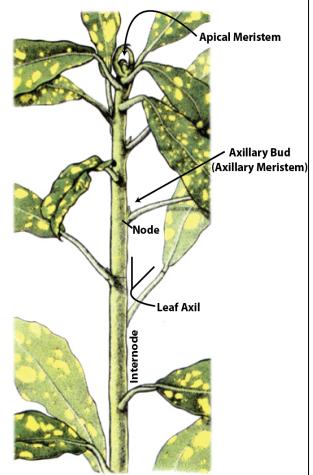
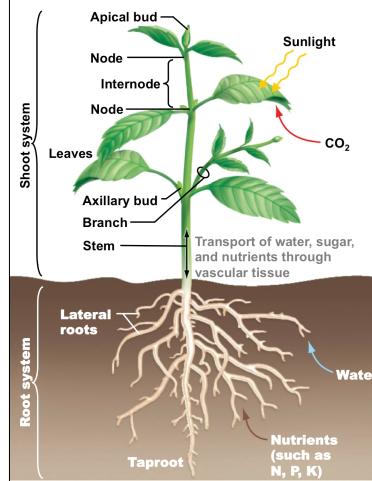
Botany 121: General Botany



Reading:

Mauseth: 189-210
(Structure of Woody Plants), stop at Secondary Growth in Roots

Lecture 5: Secondary Growth



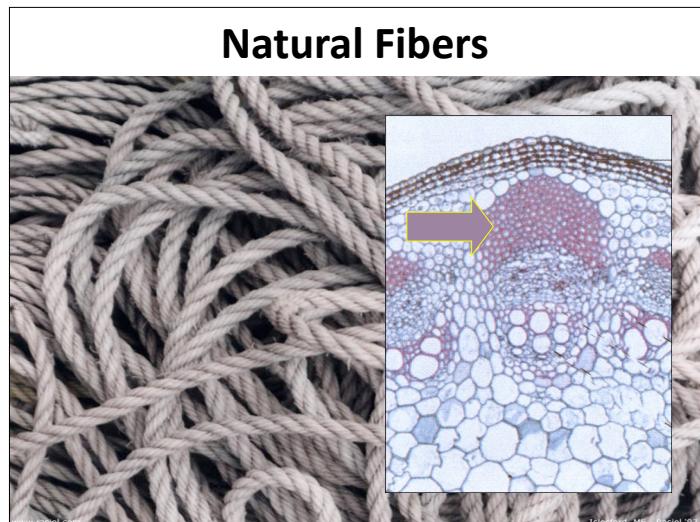
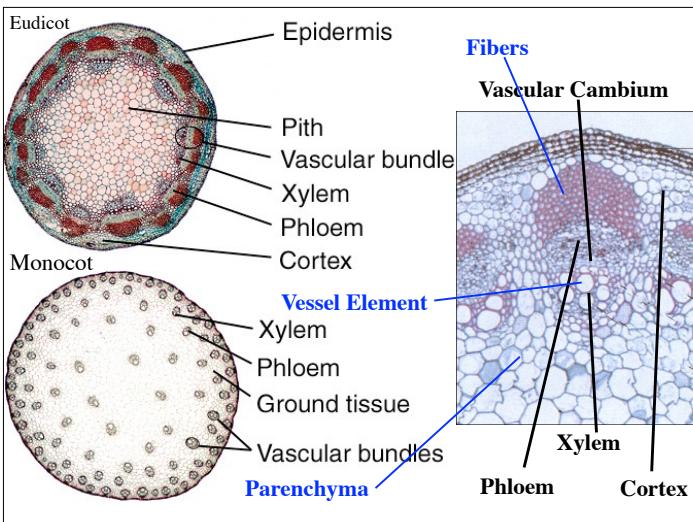
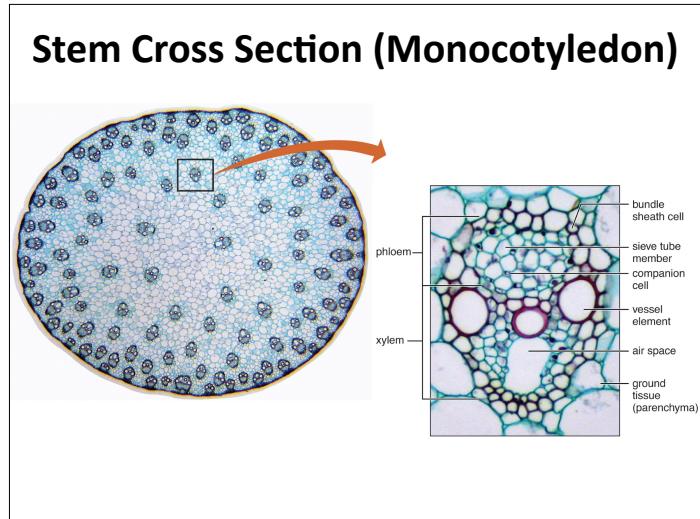
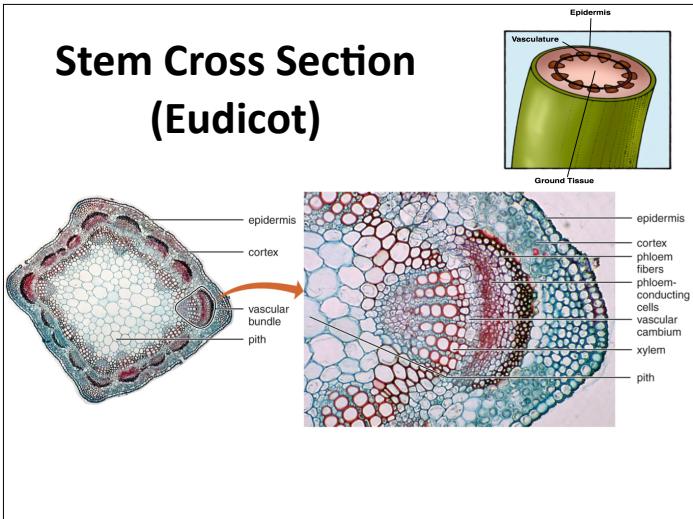
What is a monocot?

- Lilies
- Palm trees
- Grasses
- Orchids





	MONOCOT	DICOT
FLOWERS		
LEAVES		
VASCULAR TISSUE		
ROOT PATTERN		
EMBRYO IN SEED	<p>cotyledon embryo</p> <p>The monocot embryo has one cotyledon (seed leaf).</p>	<p>embryo cotyledons</p> <p>The dicot embryo has two cotyledons (seed leaves).</p>



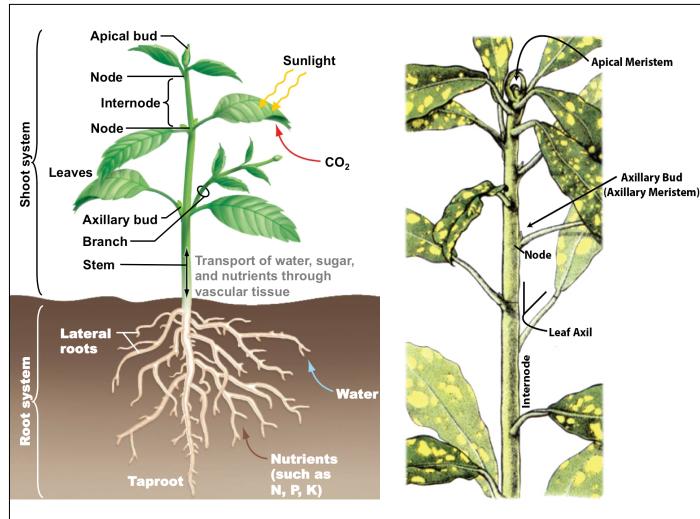
Hemp (*Cannabis sativa*)

- Plants produce very little THC
- Grown for rope, paper, clothing, fiber paneling, sailcloth, nutritional products
- Valuable and nutritional oil comes from the fruit “seeds”
- Strong and resistant to water and sea water
- 80% produced in China



Natural Fibers

- Flax (*Linum usitatissimum*)
- Linen, linseed oil, and paper



Stolons produce new individuals at nodes above ground.



Modified Stems

Rhizomes produce new individuals at nodes below ground.



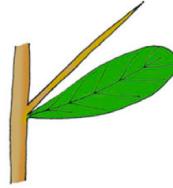
Modified Stems - Succulents

- Often round, or thickened water storing stems



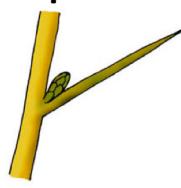
Pointy Structures on Plants

Thorn



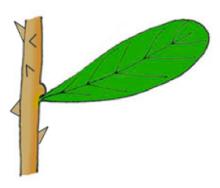
modified branch
that comes from
an axillary bud

Spine



modified leaf
that comes from
below the
axillary bud

Prickle



epidermal
outgrowths that
occur at random on
the stem (not
necessarily at nodes)

Modified Stems

- Tuber - The swollen end of an underground stem.
- Function: Nutrient Storage



Coastal Redwood
(*Sequoia sempervirens*)

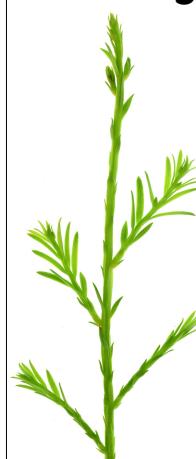
Apical Meristem

New branch

Leaf



Secondary Growth



Seasonal Growth Patterns

• Annuals:

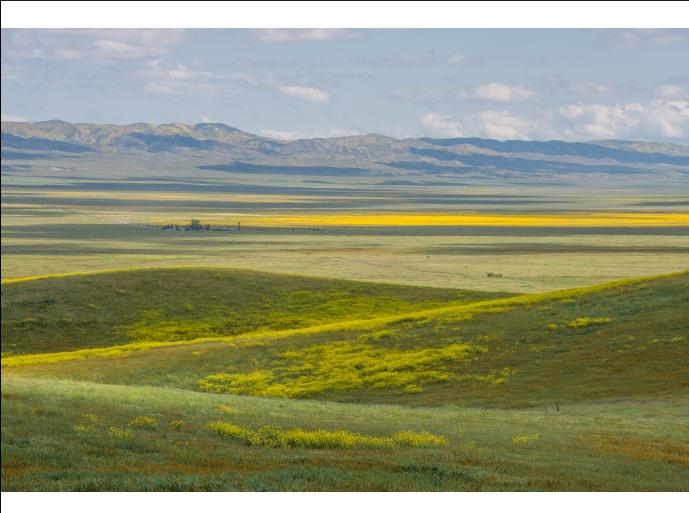
- most herbaceous plants that demonstrate only primary growth
- entire life cycle takes place in one growing season.

• Biennials:

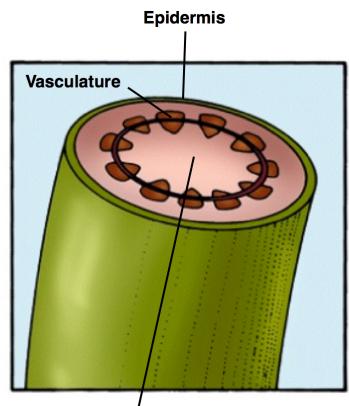
- need two seasons from germination to seed formation.

• Perennials:

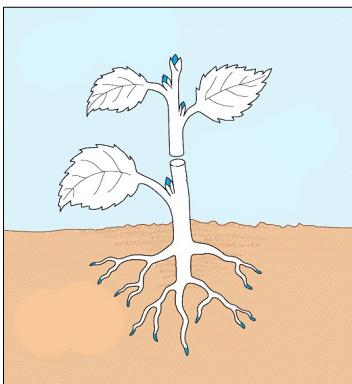
- plants that live year after year.
- woody plants that display secondary growth in their stems.
- monocots have NO true secondary growth.



After several years of growth, **perennial** plants, start to form woody (secondary tissues) and roots and stems get wider



Meristems: where growth occurs



Primary Growth

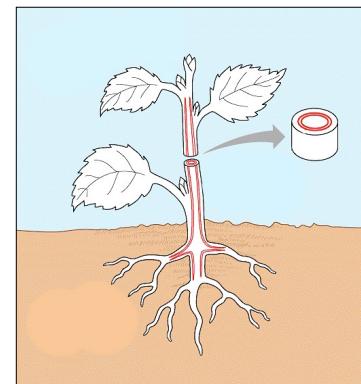
Apical meristems

(in **Blue**)

Primary tissues

Increase in length

Meristems: where growth occurs



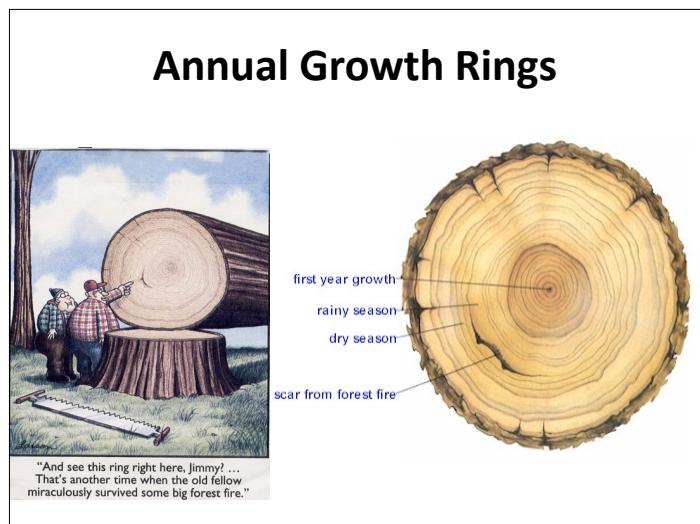
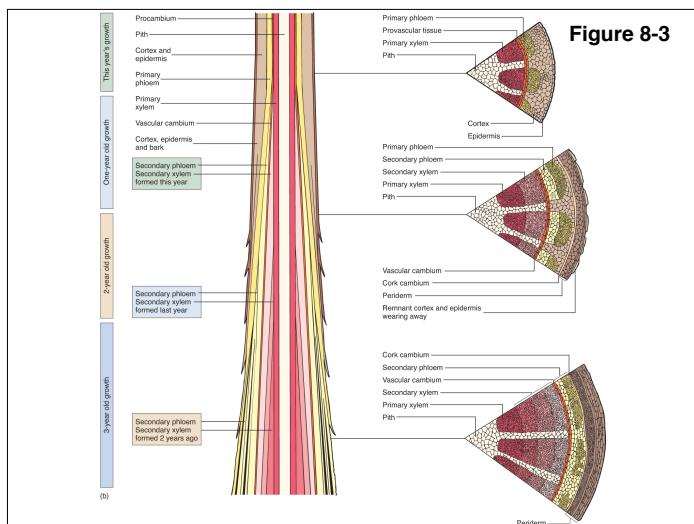
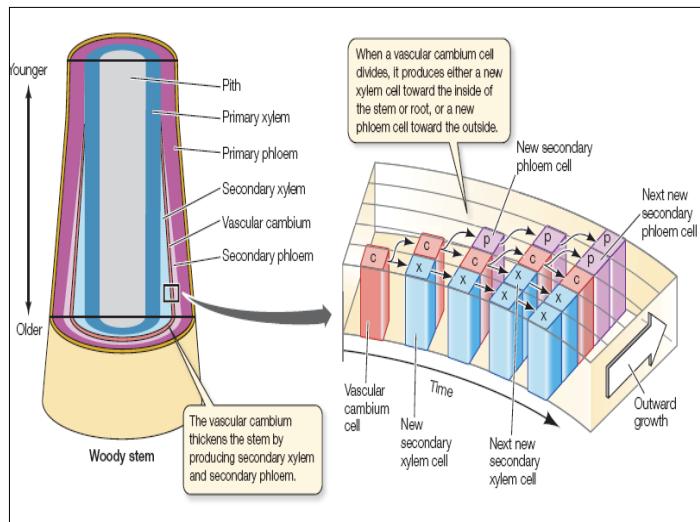
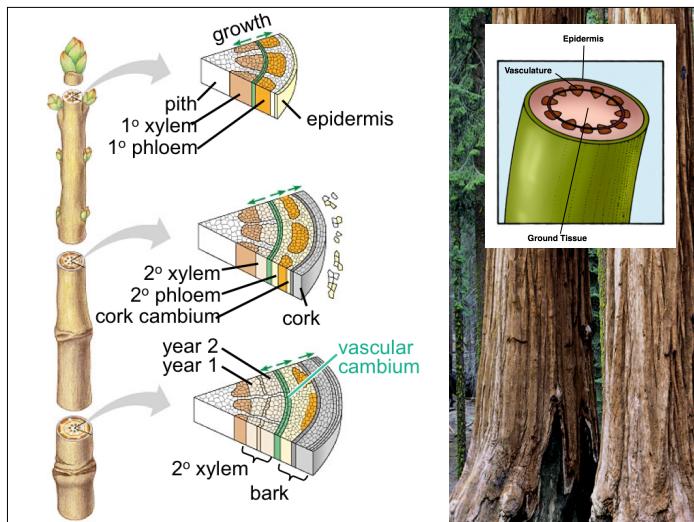
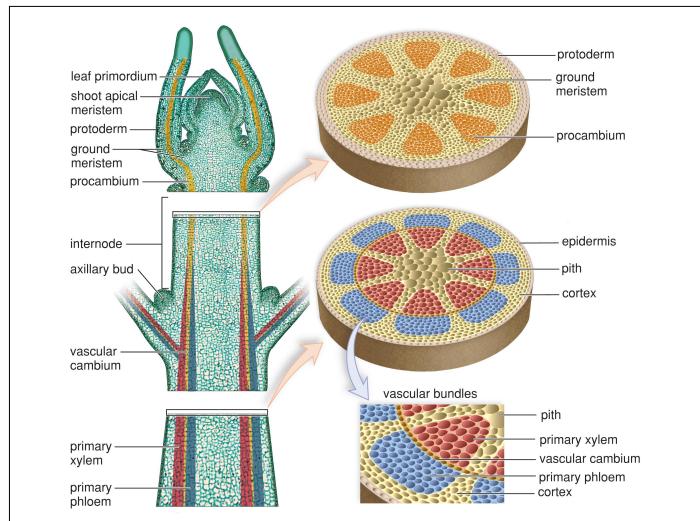
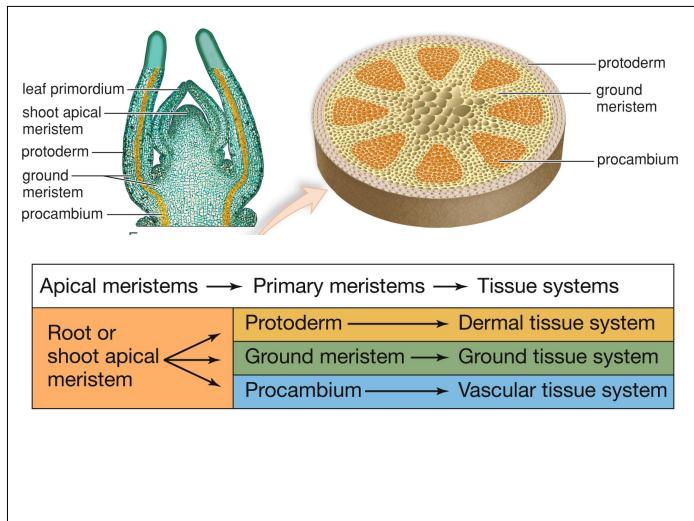
Secondary Growth

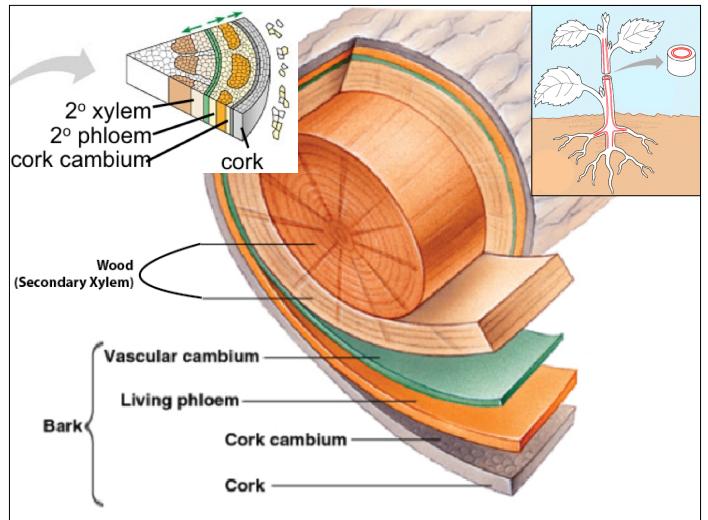
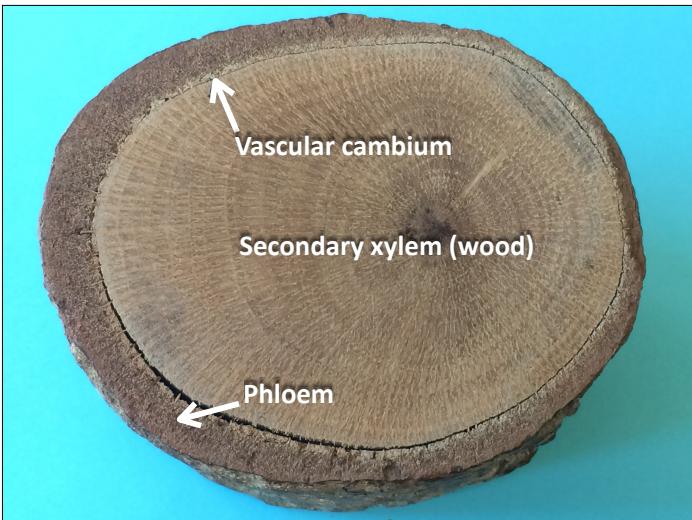
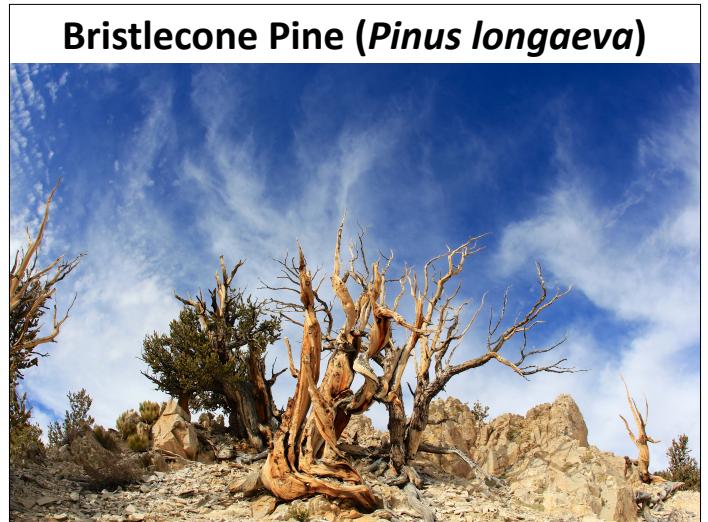
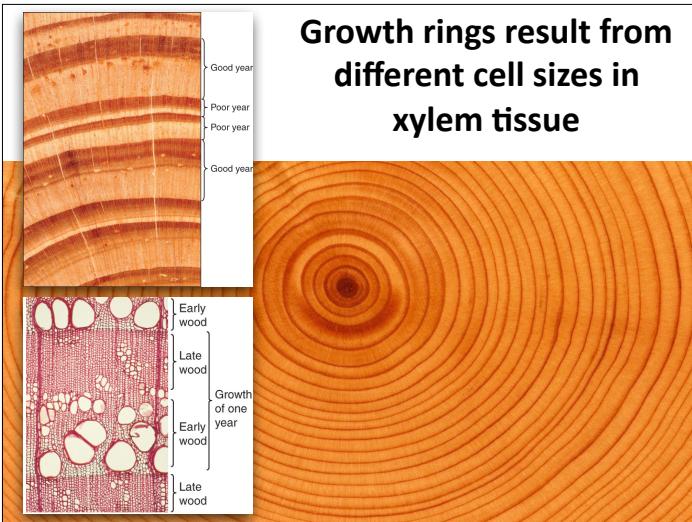
Lateral meristems

(in **Red**)

Secondary tissues

Increase in girth





Cork

- Commercial cork - Cork Oak (*Quercus suber*) bark
- Bottle stoppers, musical instruments, fishing floats, insulation, tiles, flooring, cork boards
- Cork cells that are impregnated with suberin wax



Cork (*Quercus suber*)

- Mostly grown in Portugal, other Mediterranean countries
- In the 1600's, a French monk named Dom Perignon started using cork as wine closures



