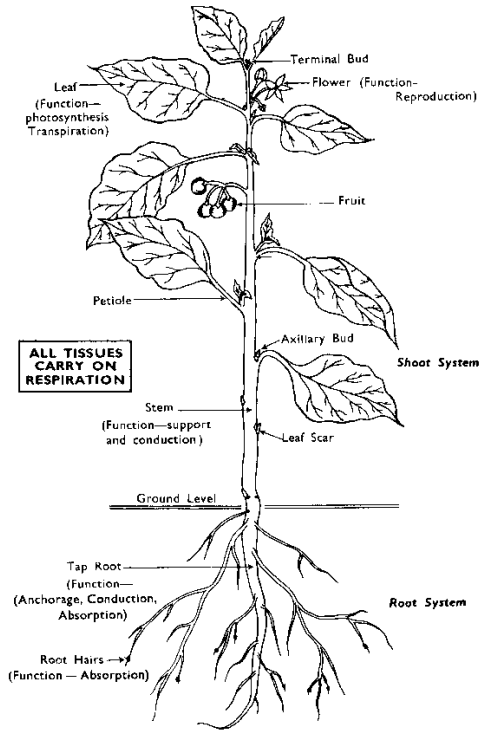


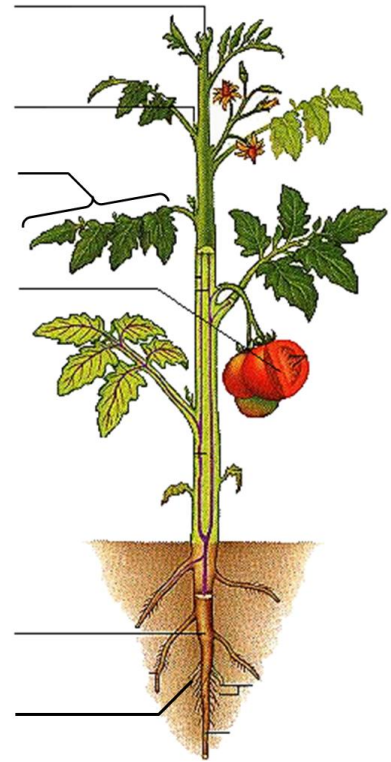
# Plant Anatomy and Physiology

Examine and learn the Basic anatomy of a plant: Try labeling this one:



A TYPICAL DICOTYLEDON  
BLACK NIGHTSHADE  
(*SOLANUM NIGRUM*)

The structure of a typical Dicotyledon. Black Nightshade (*Solanum nigrum*).



## Plant Tissues

There are three basic types of tissues in vascular plants

Dermal Tissue:

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Vascular Tissue:

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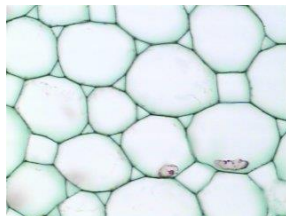
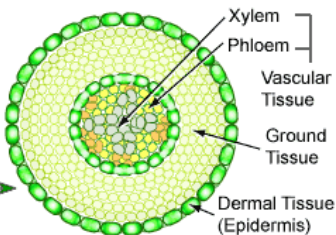
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Ground Tissue:

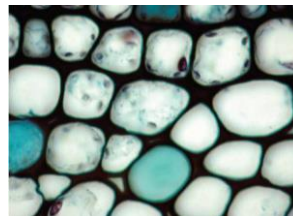
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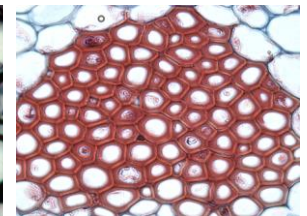
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**Parenchyma**  
thin cell wall  
living "filler" tissue  
(majority of ground tissue)



**Collenchyma**  
thick cell wall  
living support cells  
(sub-epidermis)



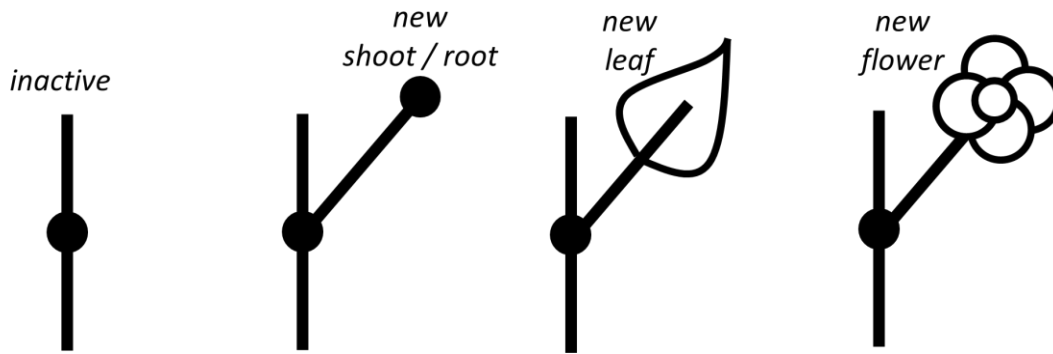
**Sclerenchyma**  
very thick cell wall  
dead support cells  
(strong plant fibres)

## **Meristematic Tissue (meristems... think about buds)**

How are meristematic cells in plants like stem cells in animals?

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*Possible fates of a meristem*



Each meristem can grow and respond to the environment independently from other meristems.  
As a result, plants display modular growth.

## **Leaves**

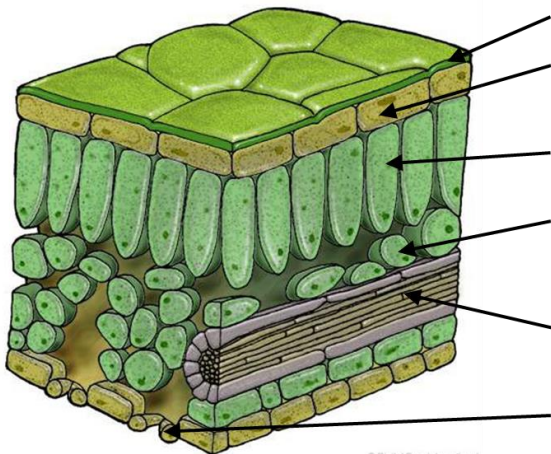
The structure of leaves maximizes photosynthesis and minimizes water loss.

Write the word equation for photosynthesis:

Which organelle would you expect to find in abundance in plant leaf cell? \_\_\_\_\_

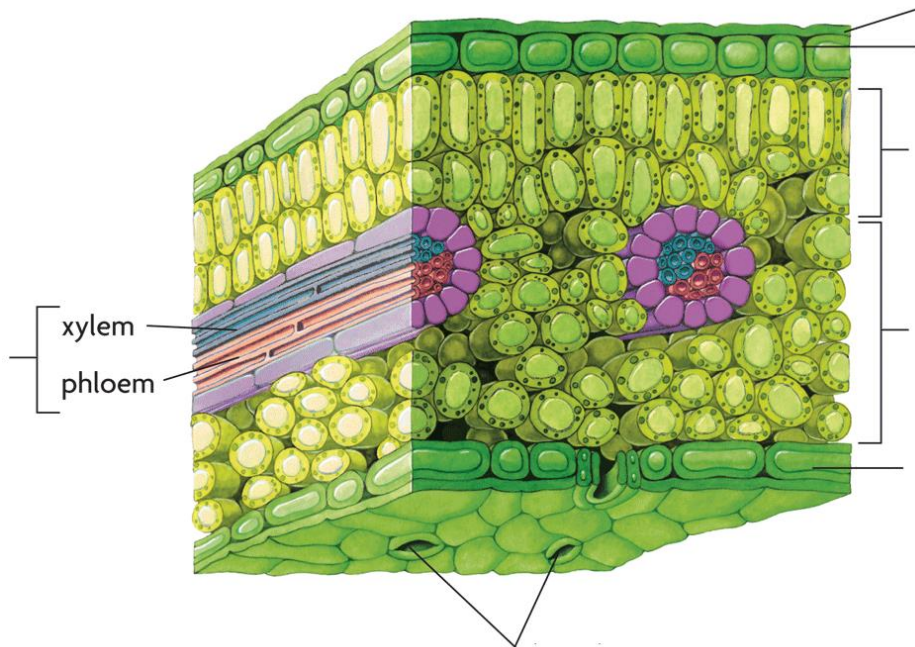
Name the most important photosynthetic pigment: \_\_\_\_\_

**Examine the leaf cross section below to learn the main parts of the leaf**



<b>EPIDERMIS</b>	<b>MESOPHYLL</b>	<b>VASCULAR BUNDLES</b>
<i>Upper epidermis</i>	<i>Palisade mesophyll</i>	<i>Xylem</i>
<i>Lower epidermis</i>	<i>Spongy mesophyll</i>	<i>Phloem</i>

Label the following diagram of a leaf cross section from memory:



*How do plants protect their leaves from being eaten by herbivores?*

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*Why do some trees drop their leaves in the winter?*

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*How do gymnosperms avoid having to drop their leaves in the winter?*

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*Take notes on the many different uses of plant leaves (include examples in food, products and medicine):  
Pg. 550-551*

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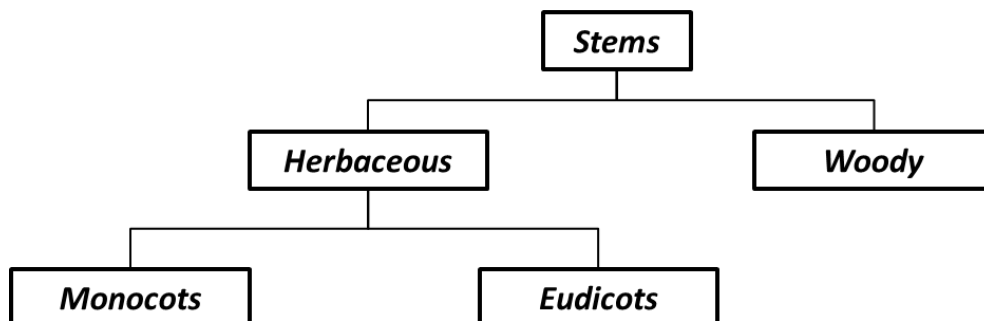
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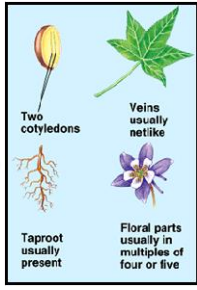
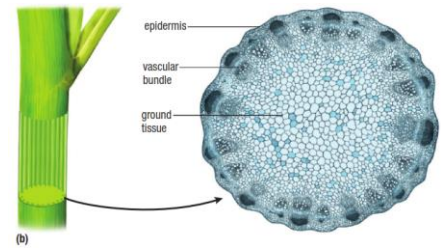
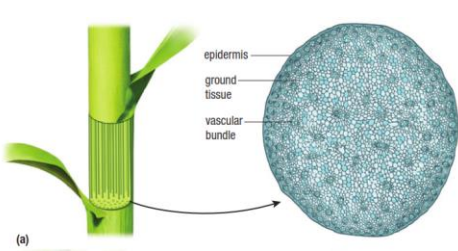
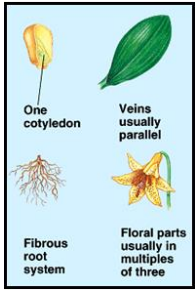
## **Stems**

Stems provide support for the above ground portion of plants. They allow leaves to reach toward light, support flowers and other reproductive structures, can offer protection for edible parts in the form of thorns, can be adapted for water and/or carbohydrate storage and some are photosynthetic.

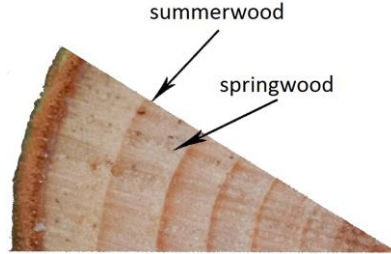
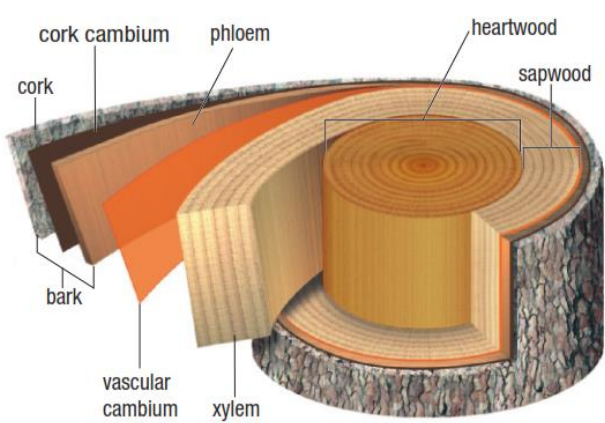


**Monocot**

**Eudicot**



**Woody Stems**



Cambium contains meristematic tissue. From it, Phloem grows toward the outside, xylem grows towards the inside.

*Explain how tree rings form.*

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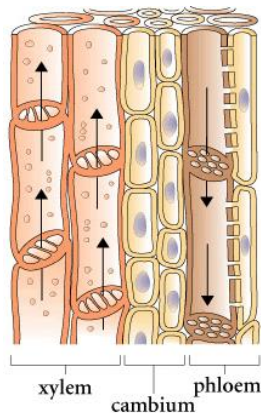
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**Xylem**

**Phloem**




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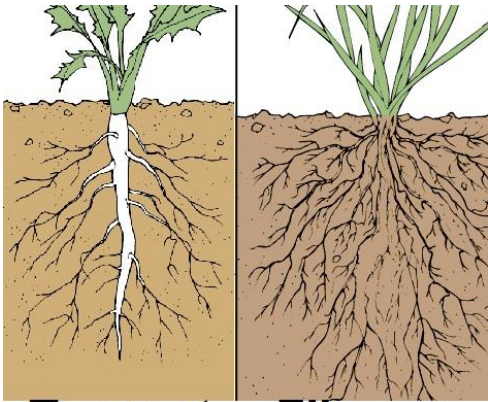
*For common human uses of plant stems, see table 2 on page 556*



# Roots

Roots anchor plants in the soil, hold the soil in place, absorb nutrients and absorb water. They can also act as underground stores of carbohydrates and water to endure harsh conditions.

There are two main types of roots:



**Taproot**

**Fibrous**

Define the following terms:

Taproot system:

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Root hairs:

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Fibrous root system:

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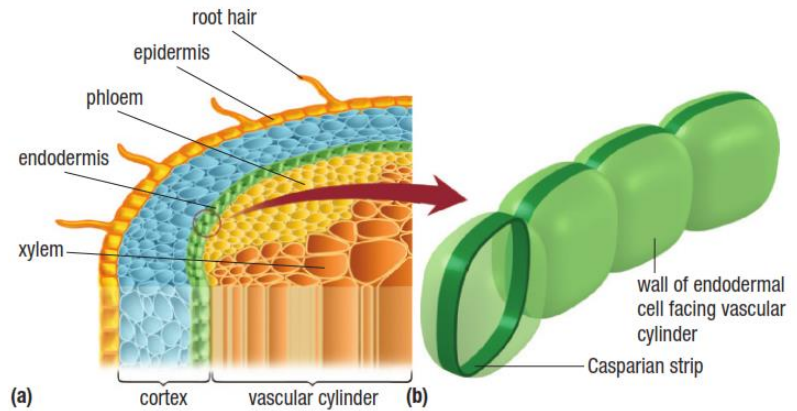
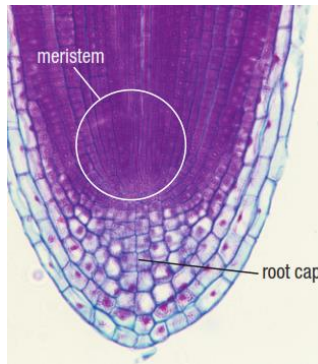
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## Root structure

Mature, differentiated cells



Direction of growth



What is the function of the root cap?

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What is the function of the Casparian strip?

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